OIPE JC181
MAR 2 8 2005
PATENT & TRADEMARK OFFICE

FIG.1

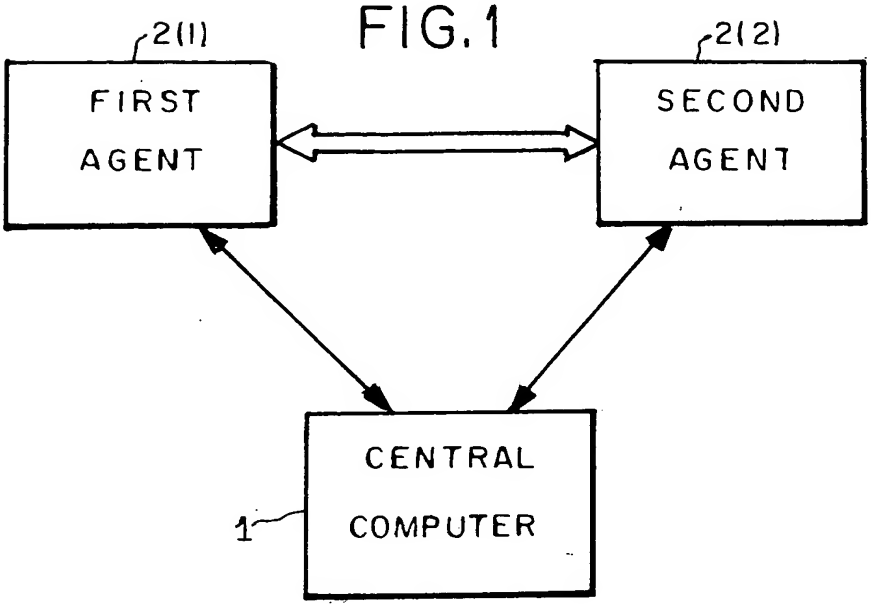


FIG.2

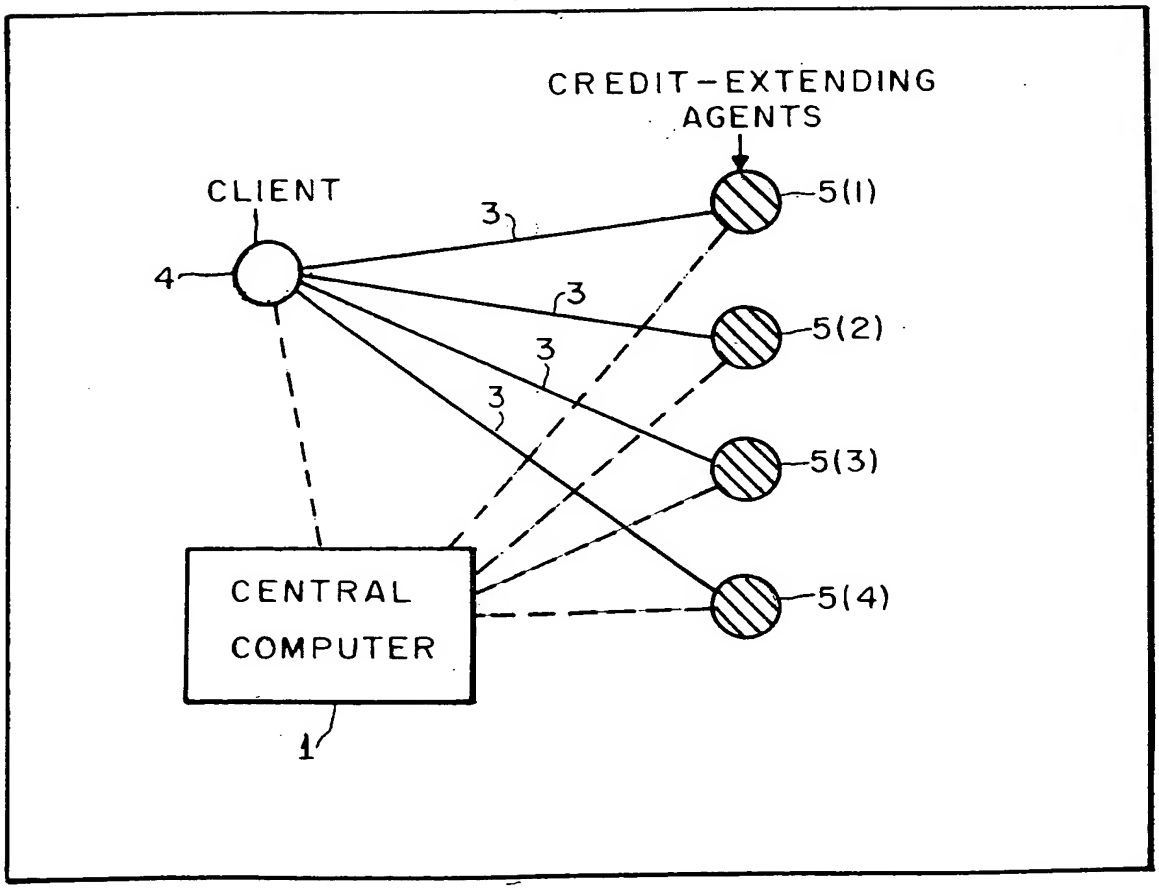


FIG.4

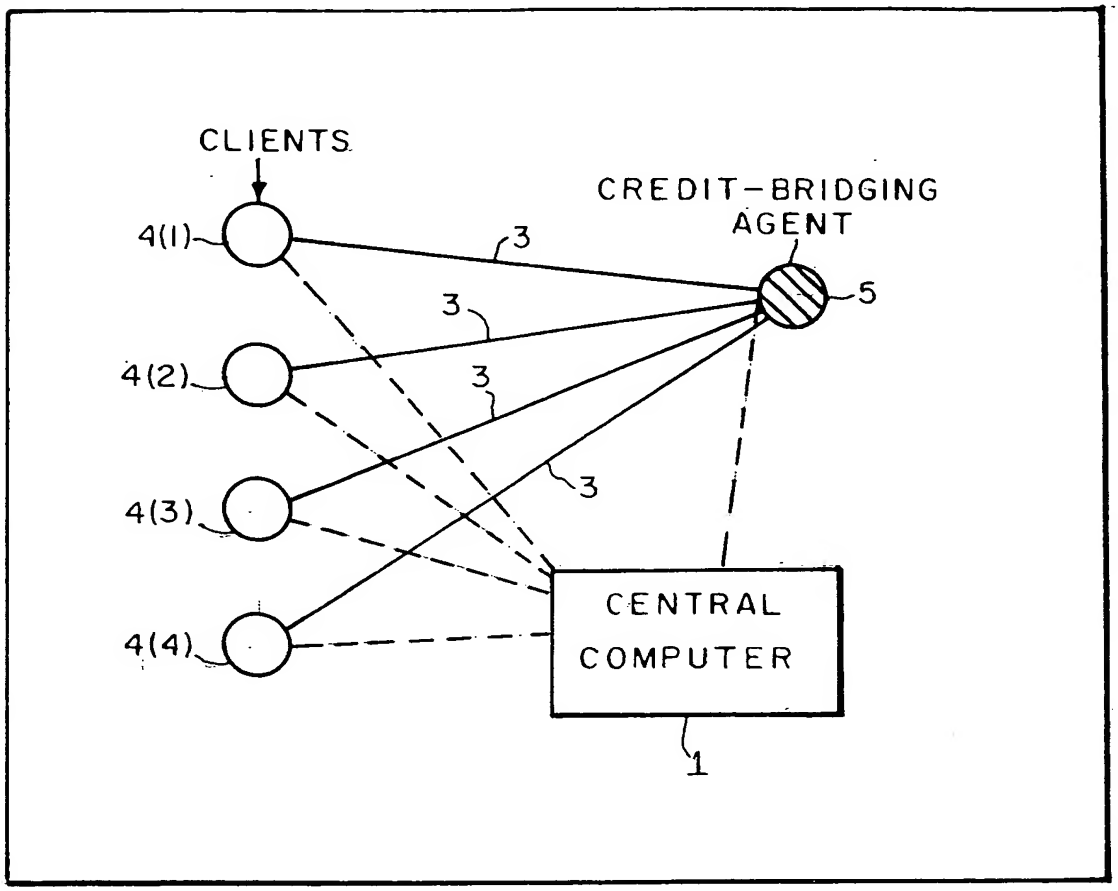

CLIENTS
CREDIT-BRIDGING AGENT
4(1)
4(2)
4(3)
4(4)
3
3
3
3
5
CENTRAL COMPUTER
1

FIG.5

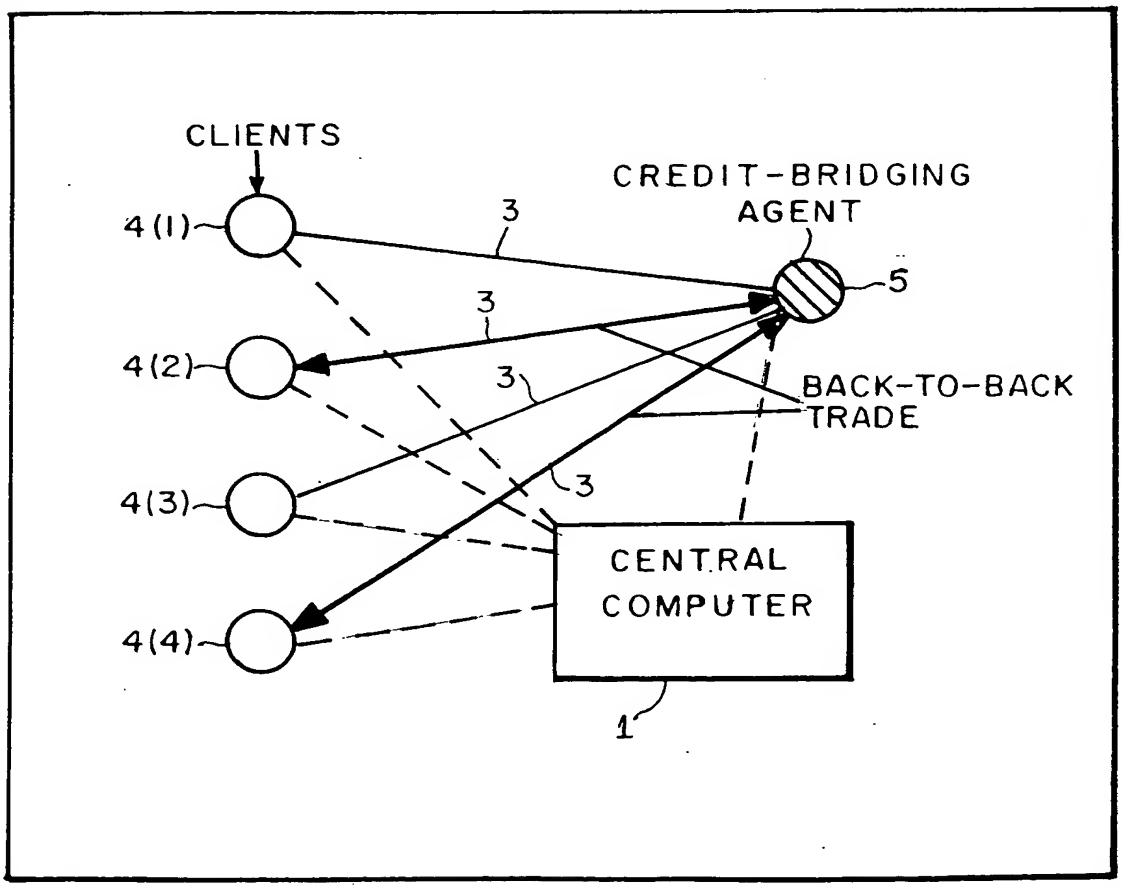

CLIENTS
CREDIT-BRIDGING AGENT
4(1)
4(2)
4(3)
4(4)
3
3
3
3
5
BACK-TO-BACK TRADE
CENTRAL COMPUTER
1

FIG.6

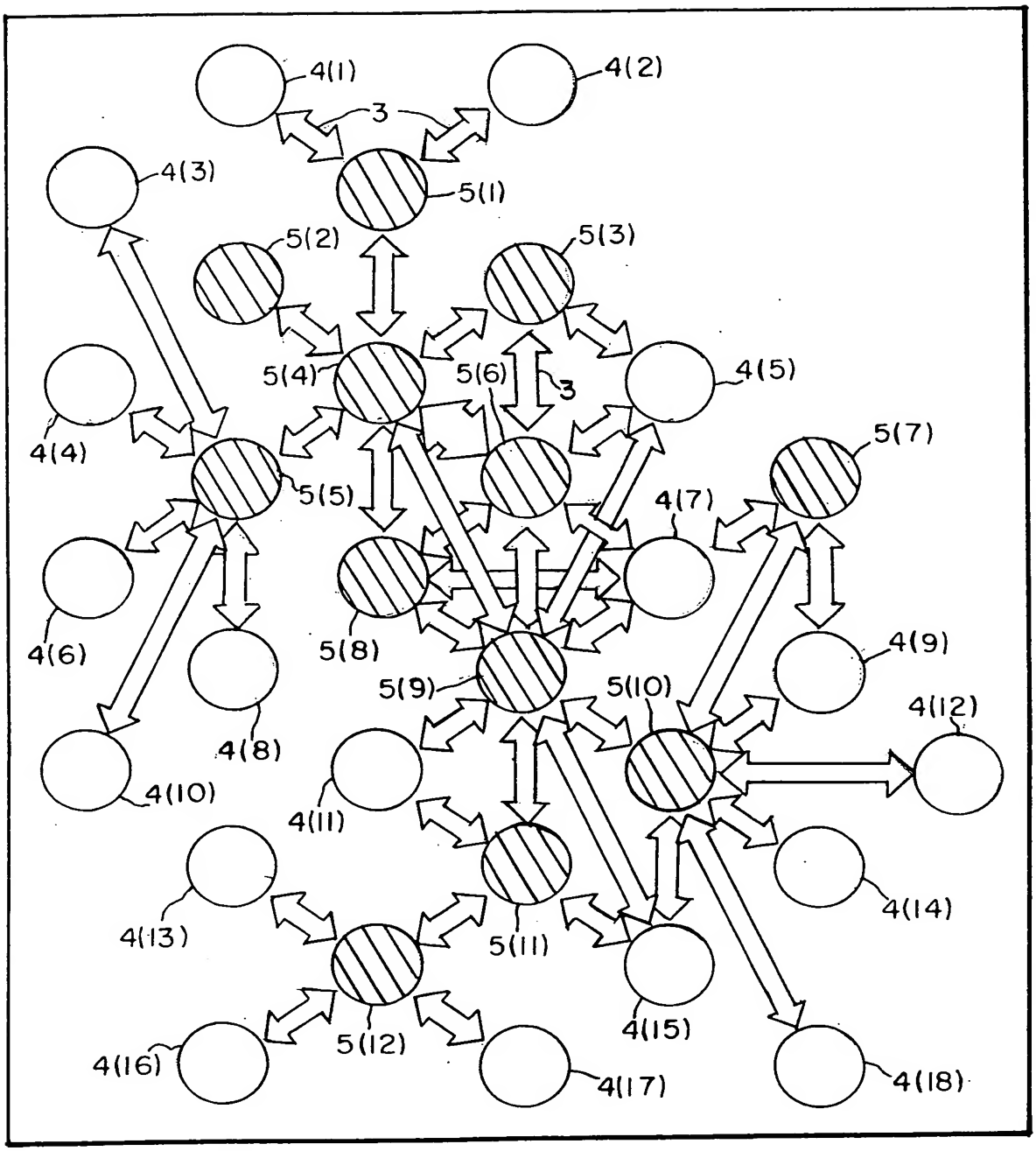

4(1)
4(2)
3
4(3)
5(1)
5(2)
5(3)
5(4)
5(6)
3
4(5)
4(4)
5(5)
5(7)
4(7)
4(6)
5(8)
4(9)
5(9)
5(10)
4(12)
4(8)
4(10)
4(11)
4(13)
5(11)
4(14)
5(12)
4(15)
4(16)
4(17)
4(18)

FIG. 7

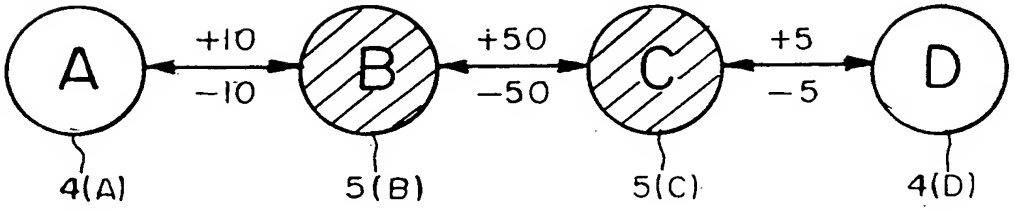

A
B
C
D
+10
−10
+50
−50
+5
−5
4(A)
5(B)
5(C)
4(D)

FIG. 8

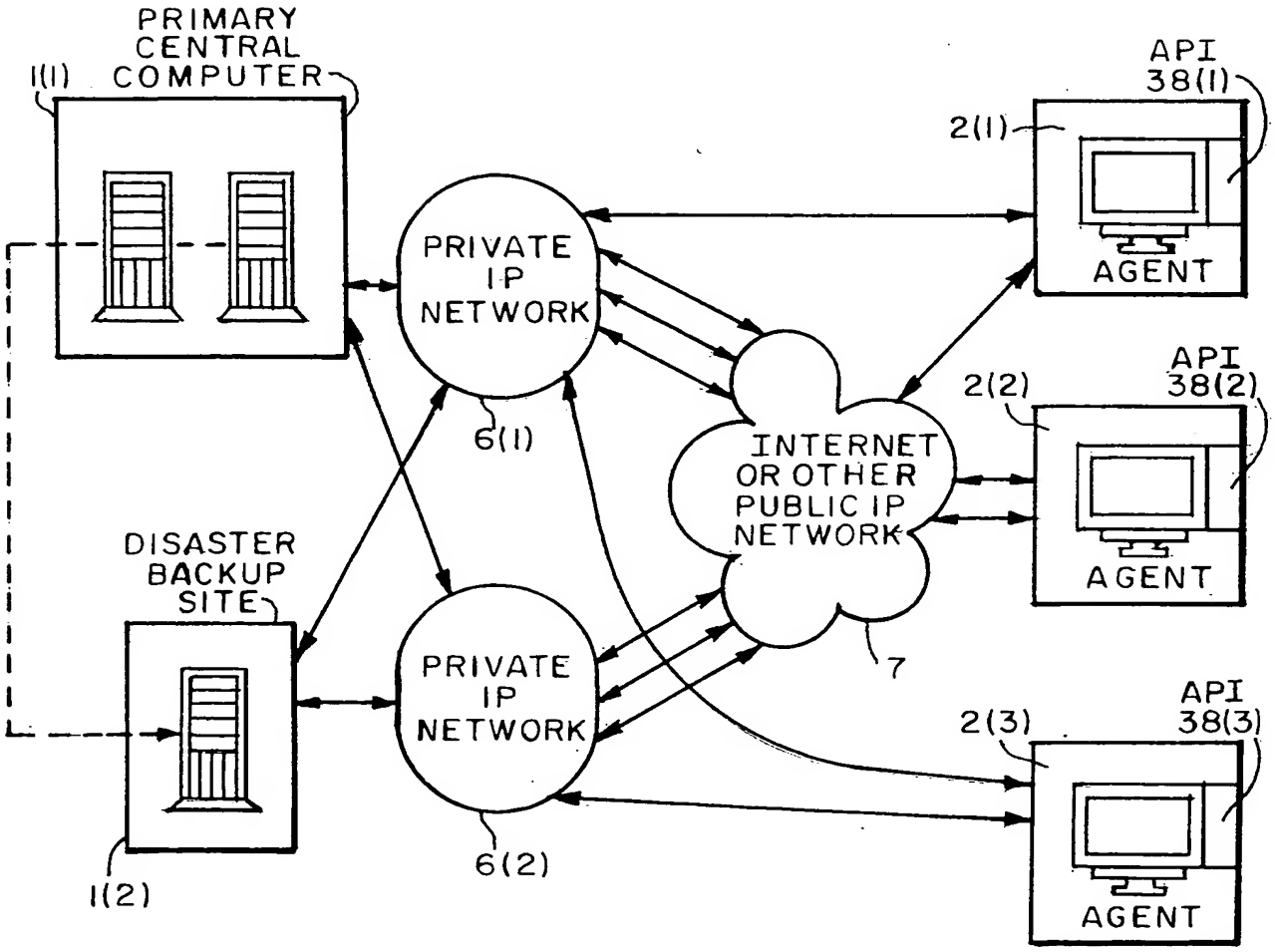

PRIMARY CENTRAL COMPUTER
1(1)
PRIVATE IP NETWORK
6(1)
DISASTER BACKUP SITE
1(2)
PRIVATE IP NETWORK
6(2)
INTERNET OR OTHER PUBLIC IP NETWORK
7
API 38(1)
2(1)
AGENT
API 38(2)
2(2)
AGENT
API 38(3)
2(3)
AGENT

FIG. 9

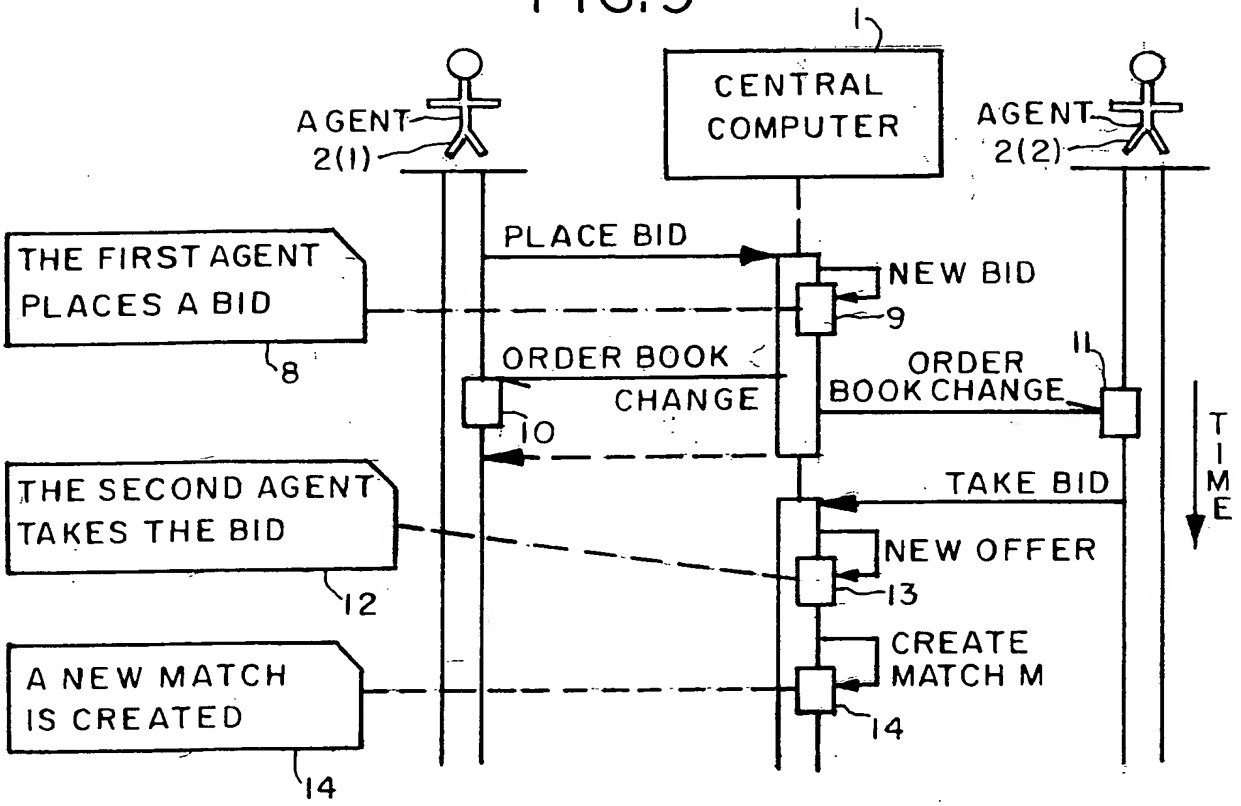

1
CENTRAL COMPUTER
AGENT 2(1)
AGENT 2(2)
PLACE BID
NEW BID
9
THE FIRST AGENT PLACES A BID
8
ORDER BOOK CHANGE
10
ORDER BOOK CHANGE
11
TIME
TAKE BID
THE SECOND AGENT TAKES THE BID
12
NEW OFFER
13
A NEW MATCH IS CREATED
14
CREATE MATCH M
14

FIG. 10

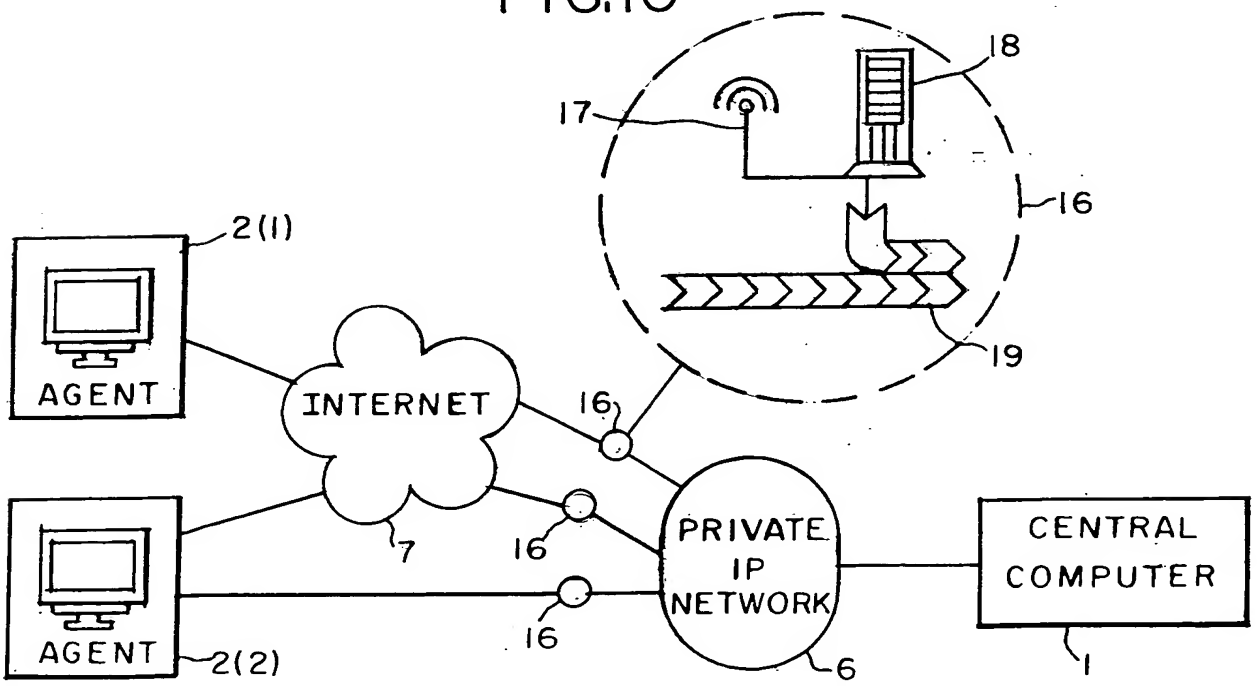

18
17
16
19
2(1)
AGENT
INTERNET
16
7
16
PRIVATE IP NETWORK
CENTRAL COMPUTER
AGENT
2(2)
16
6
1

FIG. 12

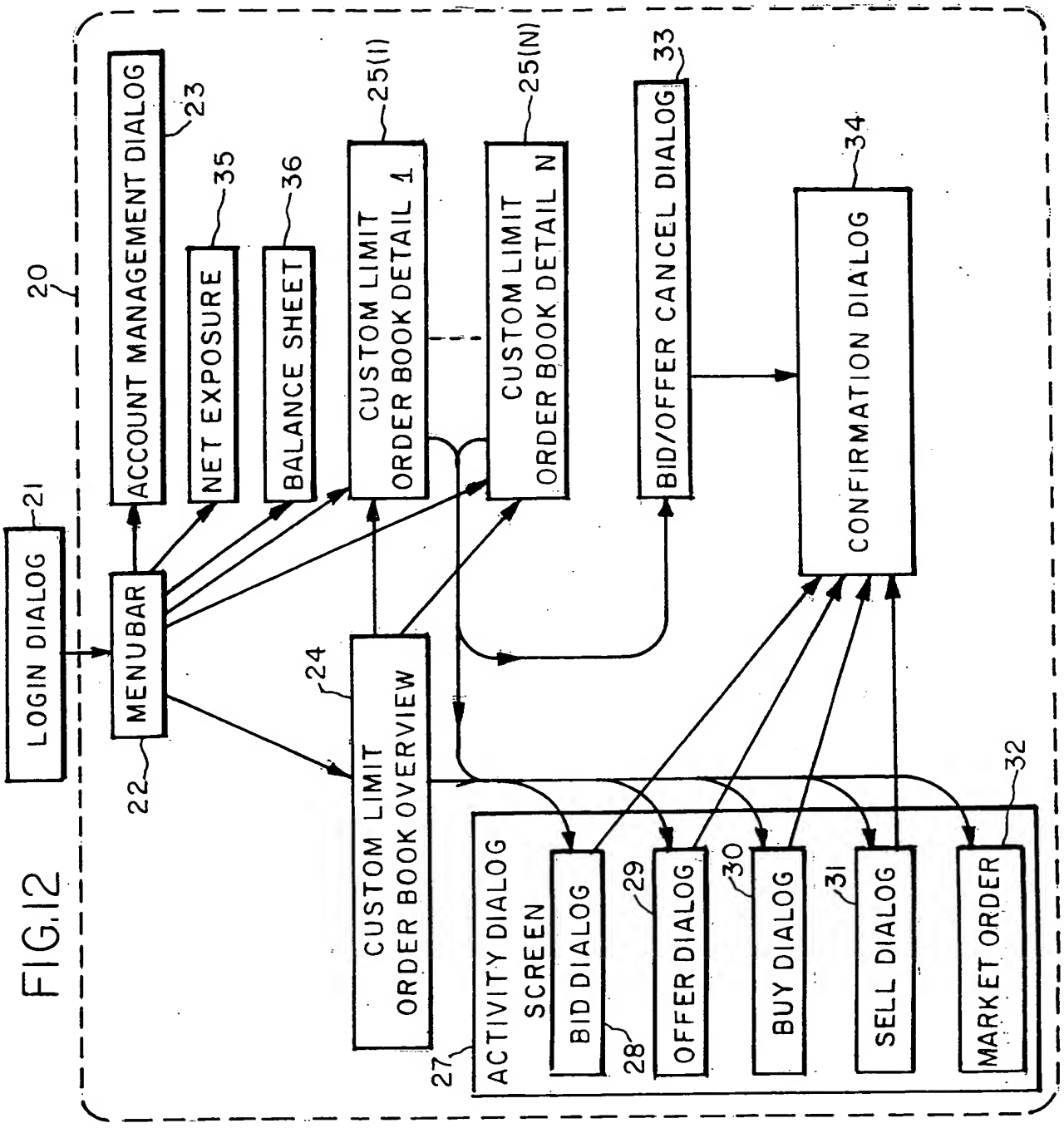
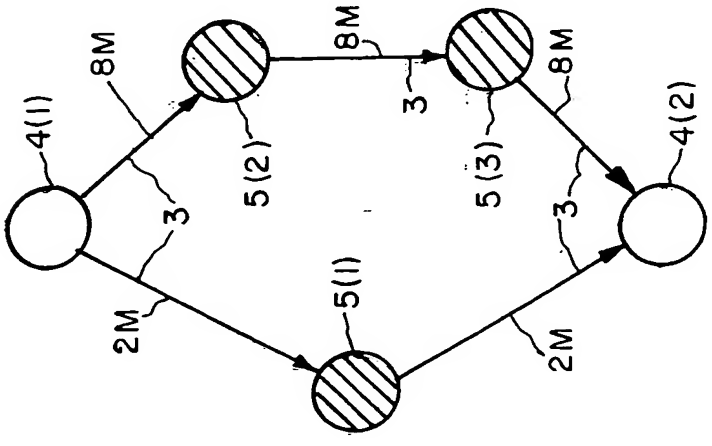

20
LOGIN DIALOG
21
MENUBAR
22
ACCOUNT MANAGEMENT DIALOG
23
NET EXPOSURE
35
BALANCE SHEET
36
CUSTOM LIMIT ORDER BOOK DETAIL 1
25(1)
CUSTOM LIMIT ORDER BOOK DETAIL N
25(N)
BID/OFFER CANCEL DIALOG
33
CONFIRMATION DIALOG
34
CUSTOM LIMIT ORDER BOOK OVERVIEW
24
ACTIVITY DIALOG SCREEN
27
BID DIALOG
28
OFFER DIALOG
29
BUY DIALOG
30
SELL DIALOG
31
MARKET ORDER
32

FIG. 11


4(1)
8M
5(2)
8M
3
5(3)
8M
4(2)
3
3
2M
5(1)
2M

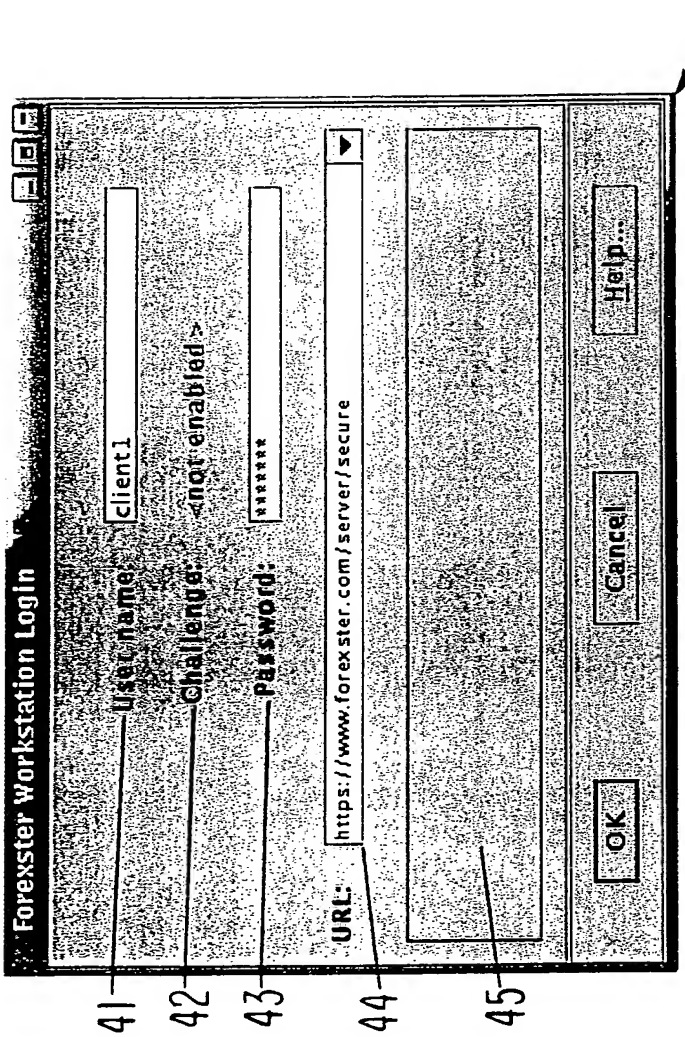

Forexster Workstation Login
User name:
client1
Challenge:
<not enabled>
Password:
****
URL:
https://www.forexster.com/server/secure
OK
Cancel
Help...
21
41
42
43
44
45

FIG.13

FIG.14

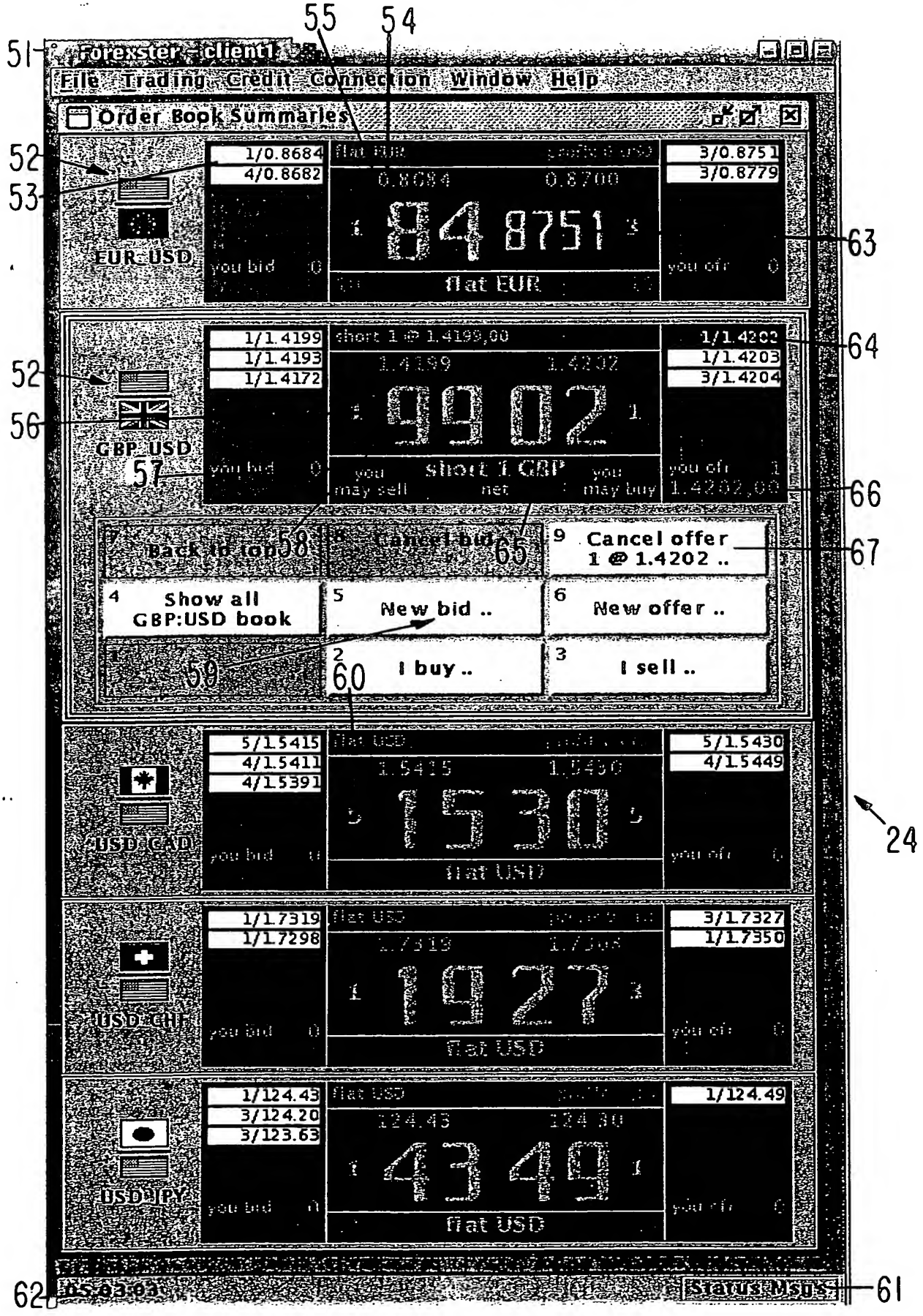

51
55
54
Forexster - client1
File Trading Credit Connection Window Help
Order Book Summaries
52
53
1/0.8684
4/0.8682
flat EUR
0.8684
0.8700
3/0.8751
3/0.8779
EUR/USD
you bid 0
you offer 0
63
1/1.4199
1/1.4193
1/1.4172
short 1 @ 1.4199,00
1.4199
1.4202
1/1.4202
1/1.4203
3/1.4204
64
52
56
GBP/USD
57
you bid 0
you may sell
short 1 GBP net
you may buy
you offer 1
1.4202,00
66
Back to top 58
Cancel bid 65
9 Cancel offer 1 @ 1.4202 ..
67
4 Show all GBP:USD book
5 New bid ..
6 New offer ..
59
60
2 I buy ..
3 I sell ..
5/1.5415
4/1.5411
4/1.5391
flat USD
1.5415
1.5430
5/1.5430
4/1.5449
USD/CAD
you bid 0
you offer 0
24
1/1.7319
1/1.7298
flat USD
1.7319
1.7327
3/1.7327
1/1.7350
USD/CHF
you bid 0
you offer 0
flat USD
1/124.43
3/124.20
3/123.63
124.43
124.49
1/124.49
USD/JPY
you bid 0
you offer 0
flat USD
62
05:03:03
Status Msgs
61

FIG. 15

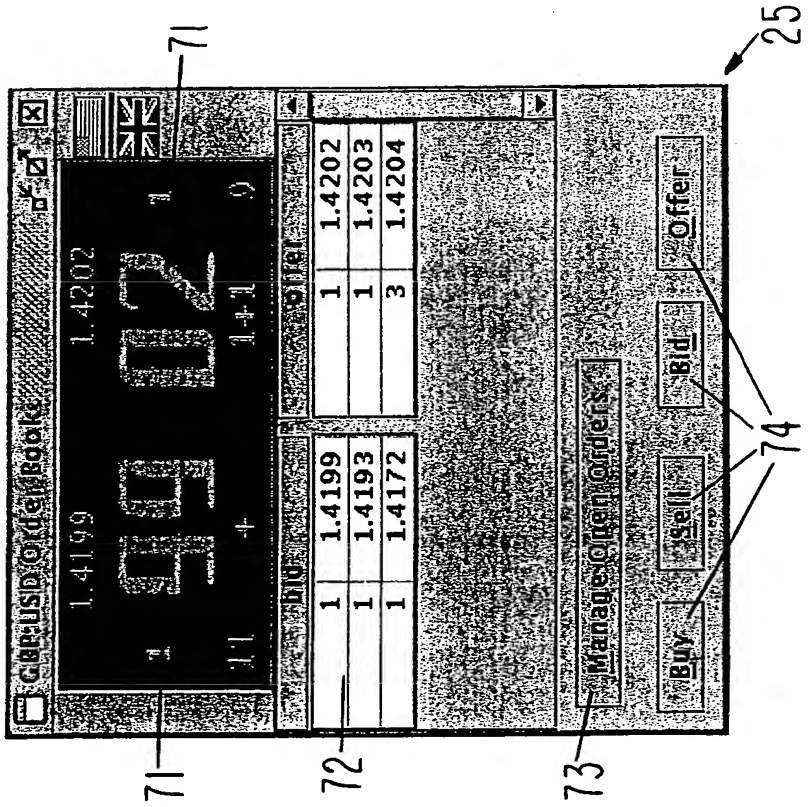
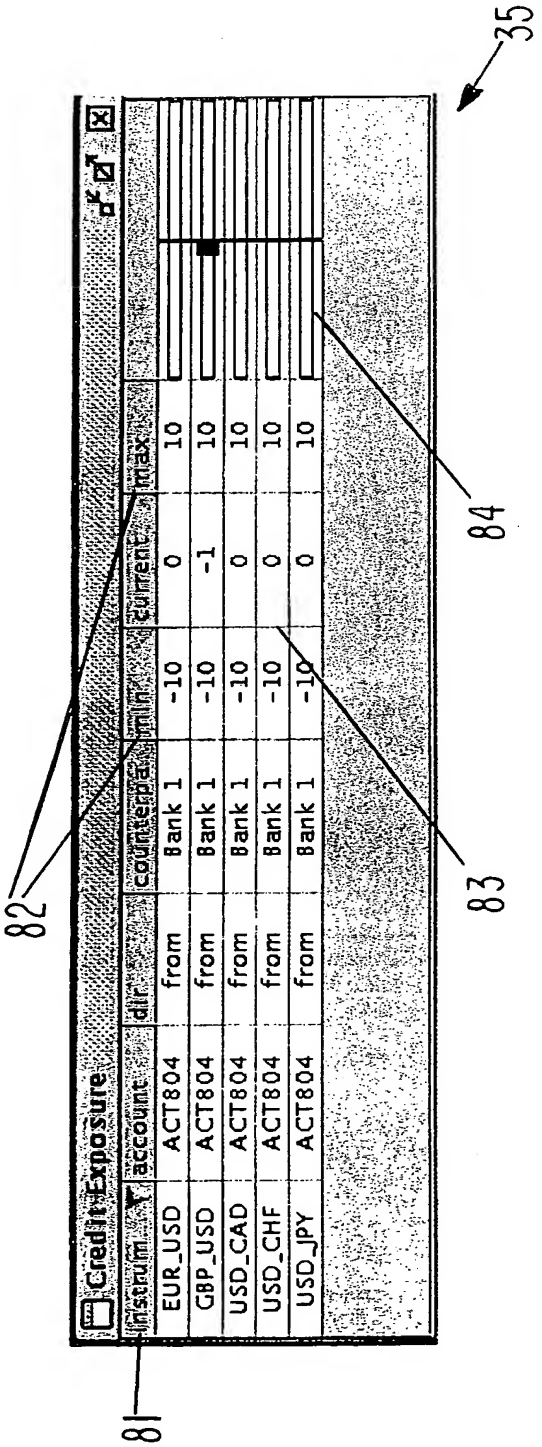

GBP/USD Order Book
1.4199
1.4202
1+1
Bid
Offer
1 1.4199
1 1.4193
1 1.4172
1 1.4202
1 1.4203
3 1.4204
Manage Open Orders
Buy
Sell
Bid
Offer
71
72
73
74
25

FIG.16


35
CreditExposure
instrum
account
dir
counterpa
min
current
max
EUR_USD ACT804 from Bank 1 -10 0 10
GBP_USD ACT804 from Bank 1 -10 -1 10
USD_CAD ACT804 from Bank 1 -10 0 10
USD_CHF ACT804 from Bank 1 -10 0 10
USD_JPY ACT804 from Bank 1 -10 0 10
81
82
83
84

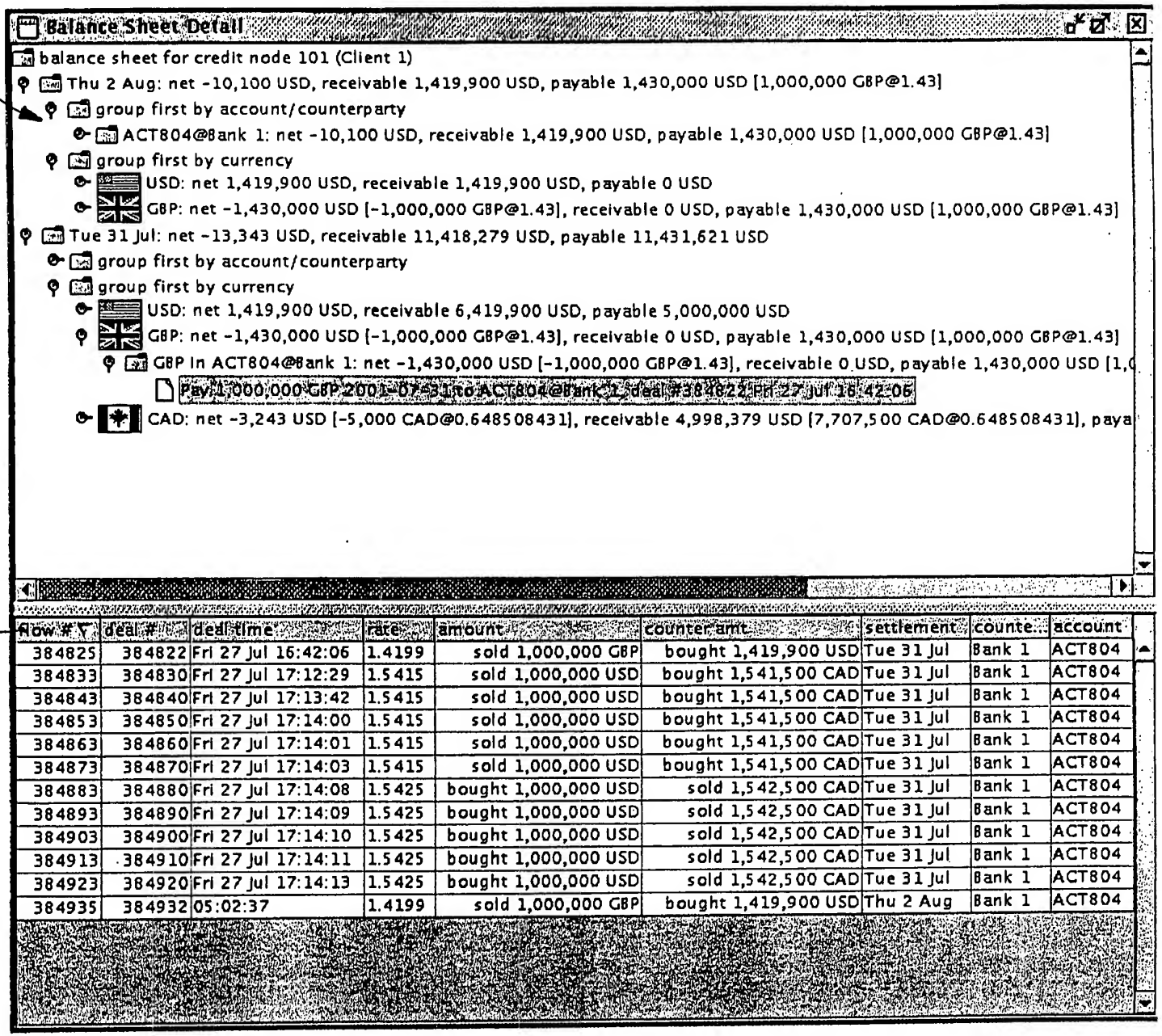

Balance Sheet Detail
91
balance sheet for credit node 101 (Client 1)
Thu 2 Aug: net -10,100 USD, receivable 1,419,900 USD, payable 1,430,000 USD [1,000,000 GBP@1.43]
group first by account/counterparty
ACT804@Bank 1: net -10,100 USD, receivable 1,419,900 USD, payable 1,430,000 USD [1,000,000 GBP@1.43]
group first by currency
USD: net 1,419,900 USD, receivable 1,419,900 USD, payable 0 USD
GBP: net -1,430,000 USD [-1,000,000 GBP@1.43], receivable 0 USD, payable 1,430,000 USD [1,000,000 GBP@1.43]
Tue 31 Jul: net -13,343 USD, receivable 11,418,279 USD, payable 11,431,621 USD
group first by account/counterparty
group first by currency
USD: net 1,419,900 USD, receivable 6,419,900 USD, payable 5,000,000 USD
GBP: net -1,430,000 USD [-1,000,000 GBP@1.43], receivable 0 USD, payable 1,430,000 USD [1,000,000 GBP@1.43]
GBP in ACT804@Bank 1: net -1,430,000 USD [-1,000,000 GBP@1.43], receivable 0 USD, payable 1,430,000 USD [1,0
Pay 1,000,000 GBP 2001-07-31 to ACT804@Bank 1 deal #384822 Fri 27 Jul 16:42:06
CAD: net -3,243 USD [-5,000 CAD@0.648508431], receivable 4,998,379 USD [7,707,500 CAD@0.648508431], paya
94
flow # | deal # | deal time | rate | amount | counter amt | settlement | counte... | account
384825 | 384822 | Fri 27 Jul 16:42:06 | 1.4199 | sold 1,000,000 GBP | bought 1,419,900 USD | Tue 31 Jul | Bank 1 | ACT804
384833 | 384830 | Fri 27 Jul 17:12:29 | 1.5415 | sold 1,000,000 USD | bought 1,541,500 CAD | Tue 31 Jul | Bank 1 | ACT804
384843 | 384840 | Fri 27 Jul 17:13:42 | 1.5415 | sold 1,000,000 USD | bought 1,541,500 CAD | Tue 31 Jul | Bank 1 | ACT804
384853 | 384850 | Fri 27 Jul 17:14:00 | 1.5415 | sold 1,000,000 USD | bought 1,541,500 CAD | Tue 31 Jul | Bank 1 | ACT804
384863 | 384860 | Fri 27 Jul 17:14:01 | 1.5415 | sold 1,000,000 USD | bought 1,541,500 CAD | Tue 31 Jul | Bank 1 | ACT804
384873 | 384870 | Fri 27 Jul 17:14:03 | 1.5415 | sold 1,000,000 USD | bought 1,541,500 CAD | Tue 31 Jul | Bank 1 | ACT804
384883 | 384880 | Fri 27 Jul 17:14:08 | 1.5425 | bought 1,000,000 USD | sold 1,542,500 CAD | Tue 31 Jul | Bank 1 | ACT804
384893 | 384890 | Fri 27 Jul 17:14:09 | 1.5425 | bought 1,000,000 USD | sold 1,542,500 CAD | Tue 31 Jul | Bank 1 | ACT804
384903 | 384900 | Fri 27 Jul 17:14:10 | 1.5425 | bought 1,000,000 USD | sold 1,542,500 CAD | Tue 31 Jul | Bank 1 | ACT804
384913 | 384910 | Fri 27 Jul 17:14:11 | 1.5425 | bought 1,000,000 USD | sold 1,542,500 CAD | Tue 31 Jul | Bank 1 | ACT804
384923 | 384920 | Fri 27 Jul 17:14:13 | 1.5425 | bought 1,000,000 USD | sold 1,542,500 CAD | Tue 31 Jul | Bank 1 | ACT804
384935 | 384932 | 05:02:37 | 1.4199 | sold 1,000,000 GBP | bought 1,419,900 USD | Thu 2 Aug | Bank 1 | ACT804
36

FIG.17

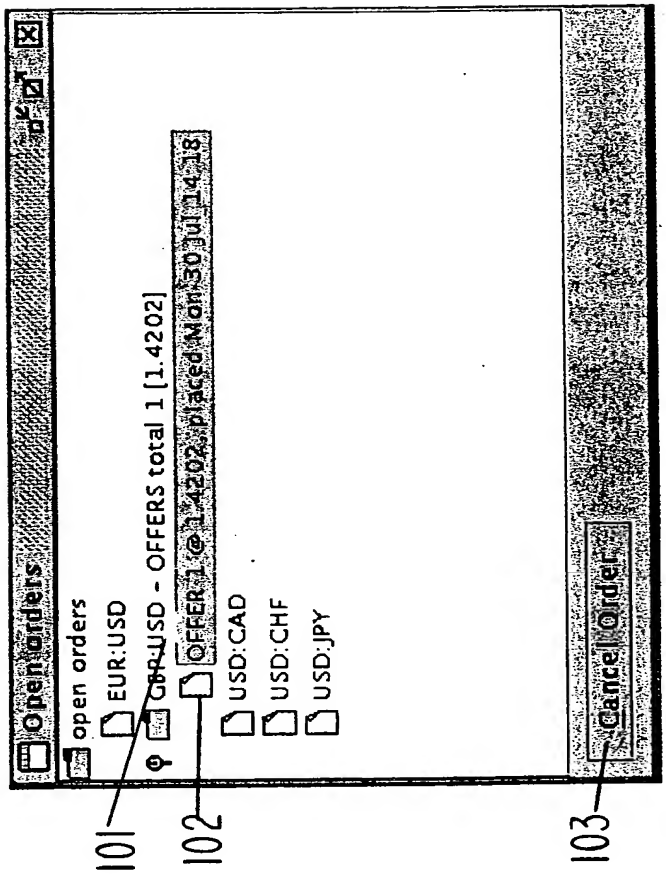

33
Open orders
open orders
EUR:USD
GBP:USD - OFFERS total 1 [1.4202]
OFFER 1 @ 1.4202 placed Mon 30 Jul 14:18
USD:CAD
USD:CHF
USD:JPY
Cancel Order
101
102
103

FIG. 18

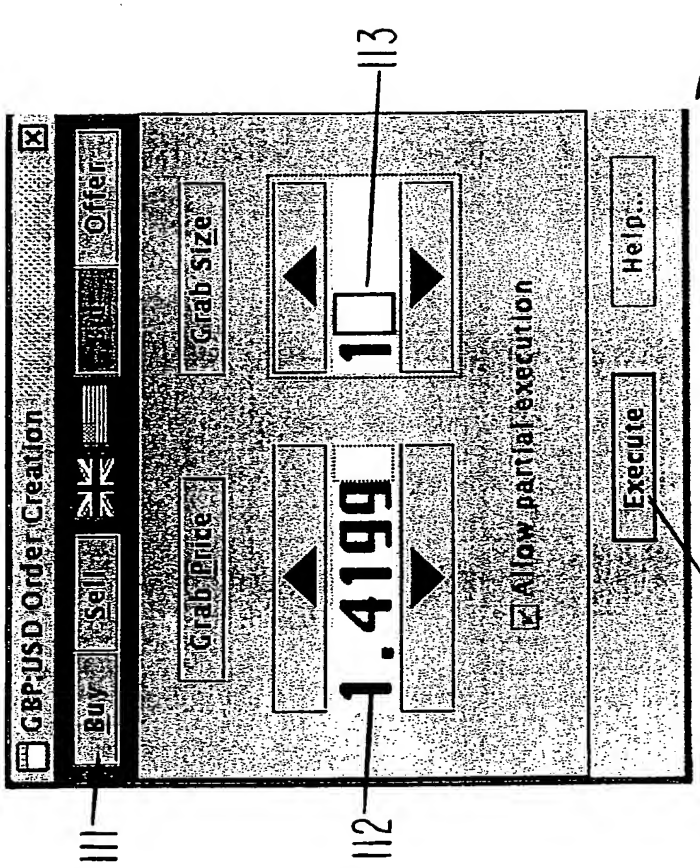

GBP-USD Order Creation
Buy
Sell
Offer
Grab Size
Grab Price
1.4199
1
Allow partial execution
Execute
Help...
111
112
113
114
28

FIG.19

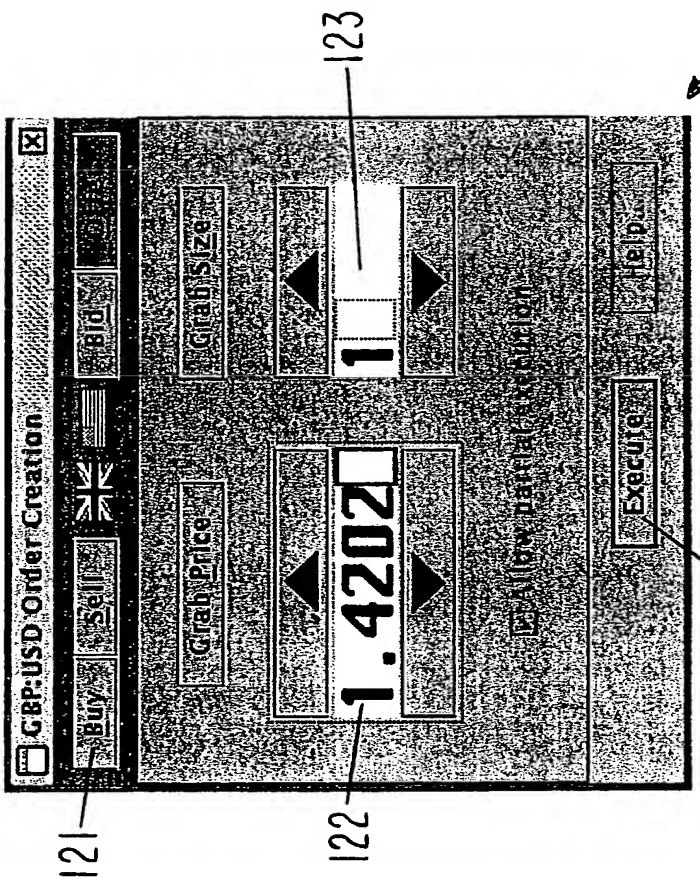

GBP:USD Order Creation
Buy
Sell
Grab Price
1.4202
Grab Size
1
Allow partial execution
Execute
Help
121
122
123
124
29

FIG.20

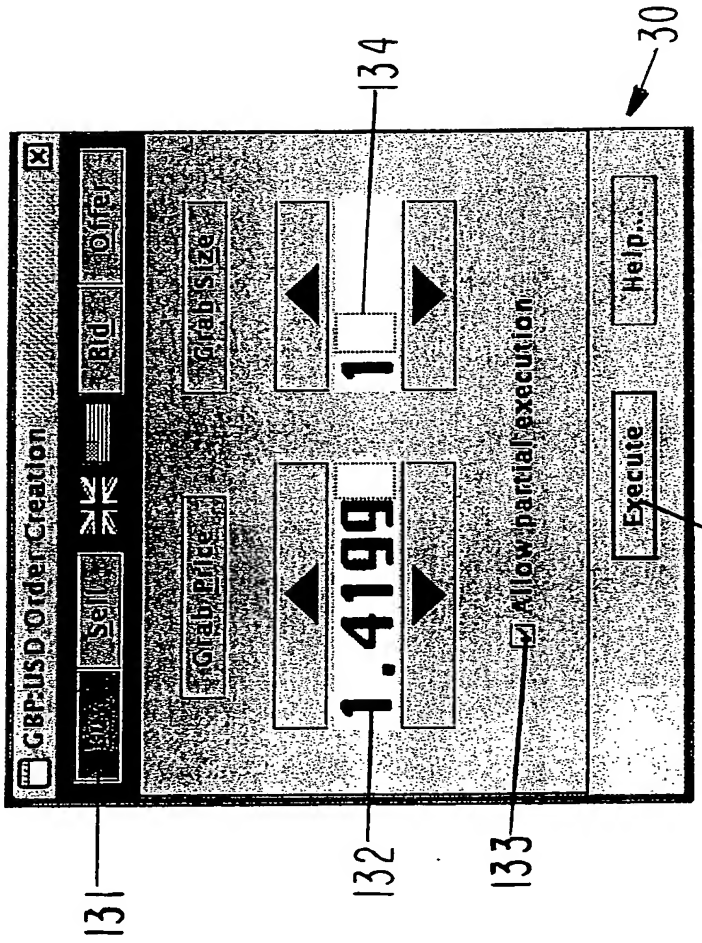

GBP/USD Order Creation
Sell
Bid
Offer
Grab Price
Grab Size
1.4199
1
Allow partial execution
Execute
Help...
131
132
133
134
135
30

FIG. 21

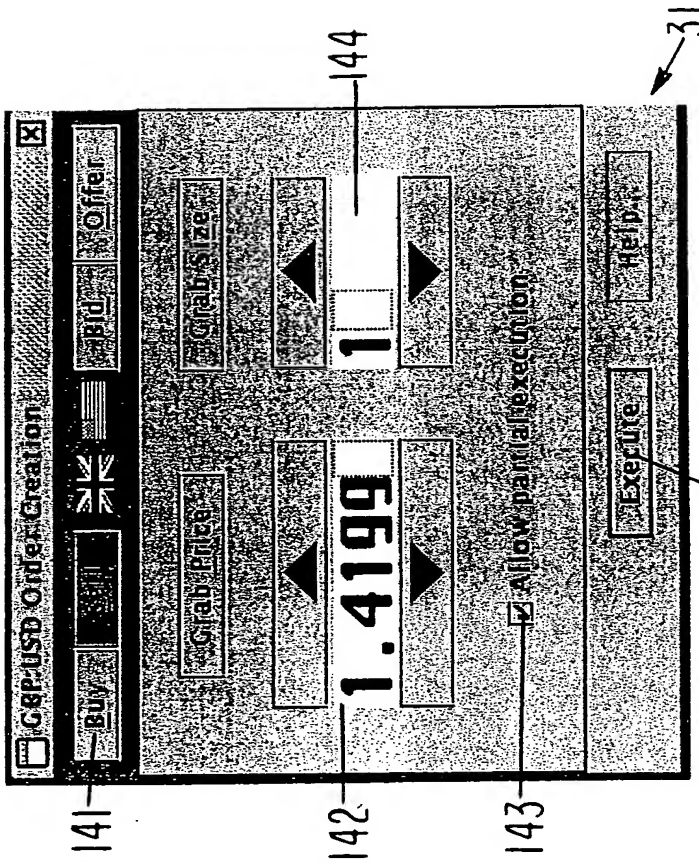

31
144
G&P USD Order Creation
Buy
Bid
Offer
Grab Price
Grab Size
1.4199
1
Allow partial execution
Help
Execute
145
141
142
143

FIG.22

FIG. 23

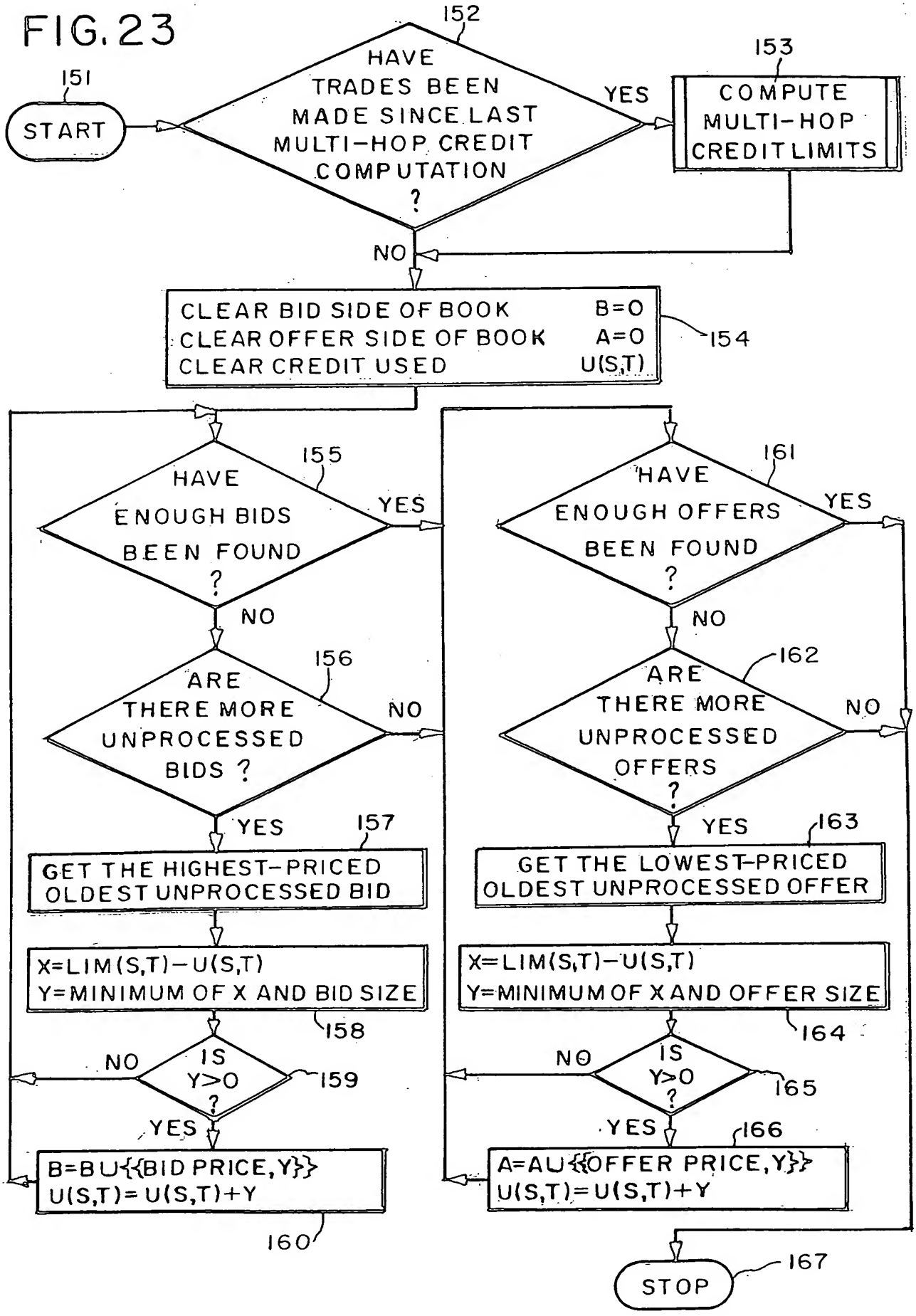

151
START
152
HAVE TRADES BEEN MADE SINCE LAST MULTI-HOP CREDIT COMPUTATION ?
YES
153
COMPUTE MULTI-HOP CREDIT LIMITS
NO
CLEAR BID SIDE OF BOOK B=0
CLEAR OFFER SIDE OF BOOK A=0
CLEAR CREDIT USED U(S,T)
154
155
HAVE ENOUGH BIDS BEEN FOUND ?
YES
NO
156
ARE THERE MORE UNPROCESSED BIDS ?
NO
YES
157
GET THE HIGHEST-PRICED OLDEST UNPROCESSED BID
X=LIM(S,T)−U(S,T)
Y=MINIMUM OF X AND BID SIZE
158
IS Y>0 ?
NO
159
YES
B=B∪{{BID PRICE, Y}}
U(S,T)=U(S,T)+Y
160
161
HAVE ENOUGH OFFERS BEEN FOUND ?
YES
NO
162
ARE THERE MORE UNPROCESSED OFFERS ?
NO
YES
163
GET THE LOWEST-PRICED OLDEST UNPROCESSED OFFER
X=LIM(S,T)−U(S,T)
Y=MINIMUM OF X AND OFFER SIZE
164
IS Y>0 ?
NO
165
YES
166
A=A∪{{OFFER PRICE, Y}}
U(S,T)=U(S,T)+Y
STOP
167

FIG.24

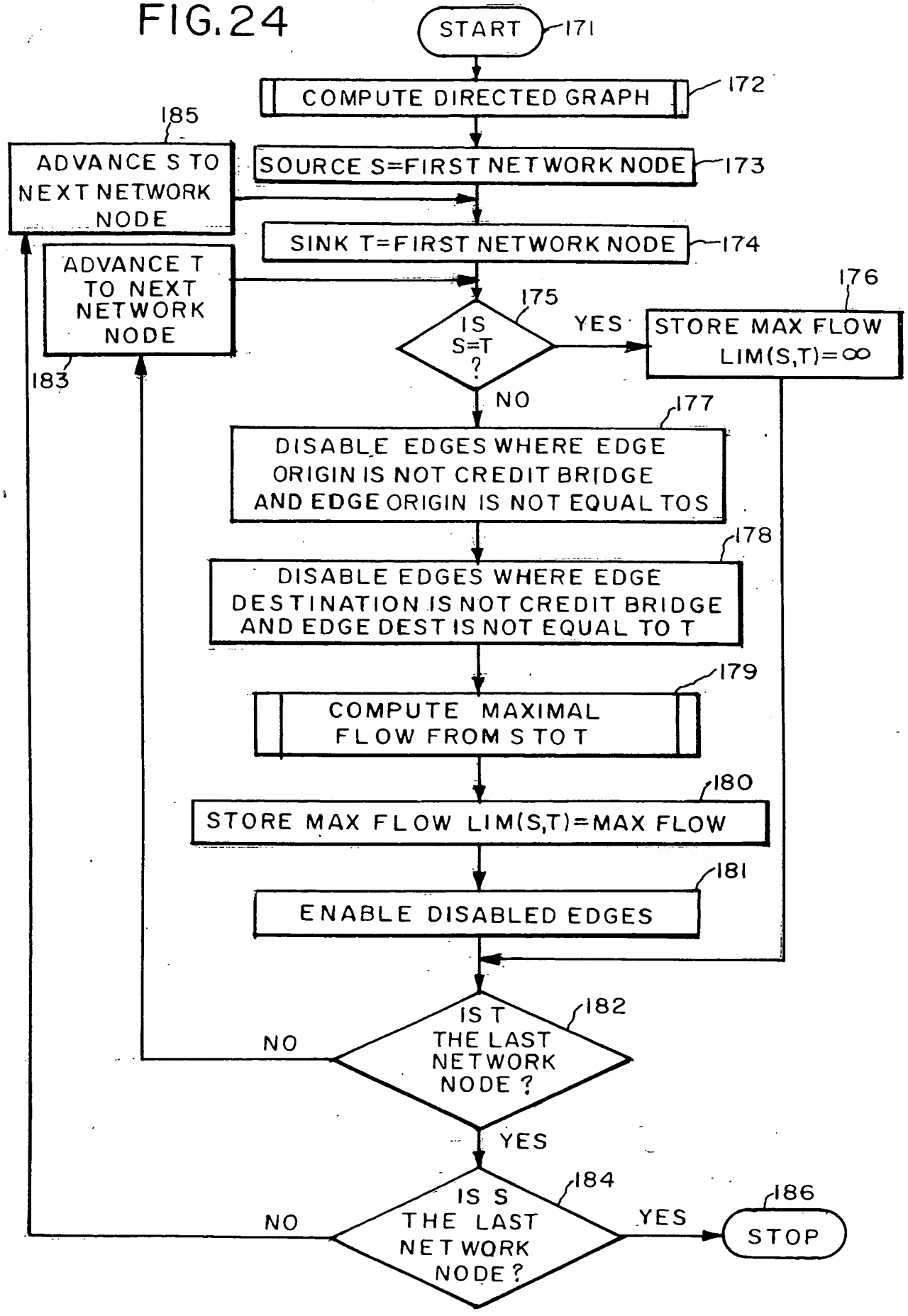
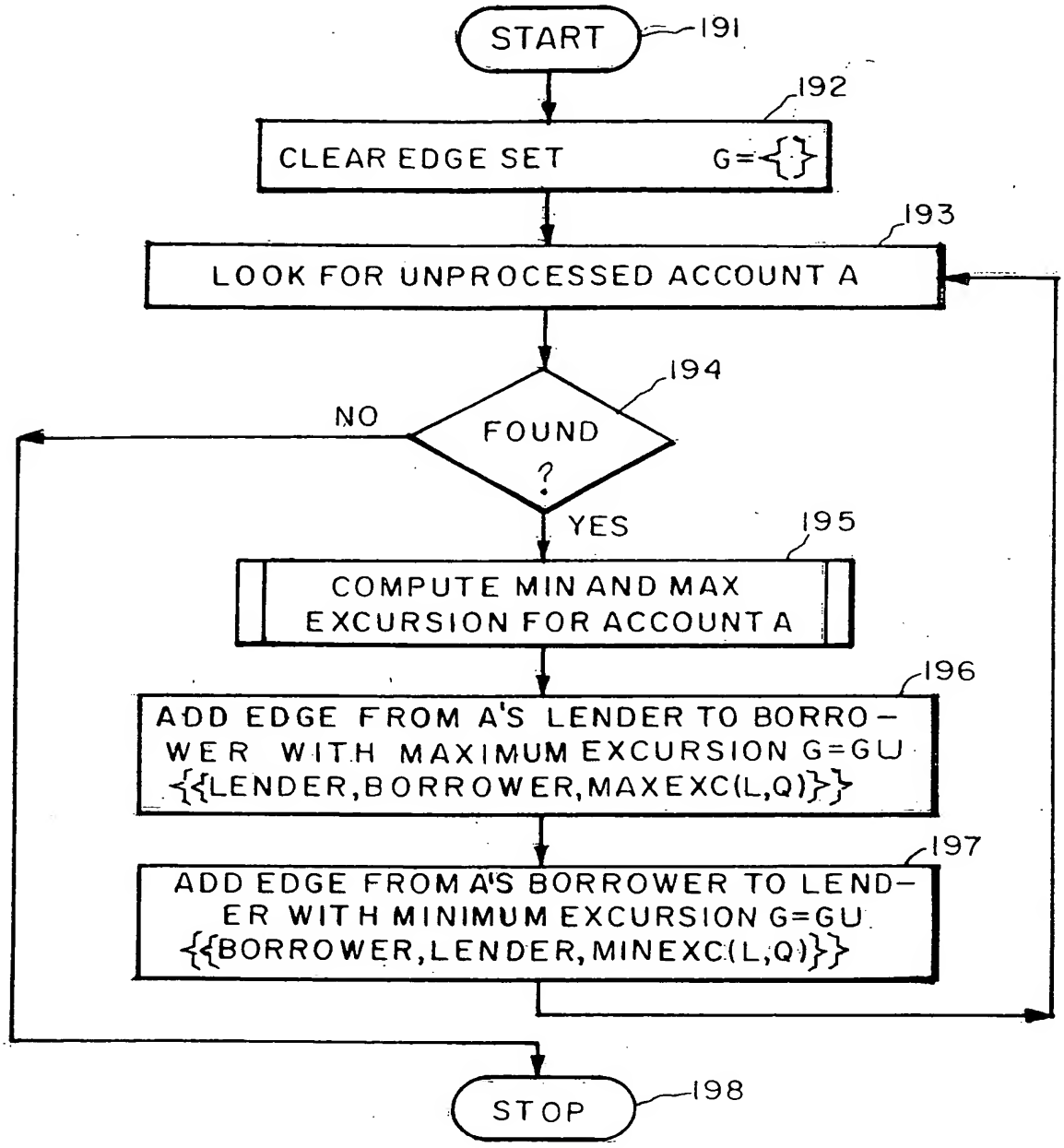

START
171
COMPUTE DIRECTED GRAPH
172
SOURCE S=FIRST NETWORK NODE
173
SINK T=FIRST NETWORK NODE
174
IS S=T ?
175
YES
STORE MAX FLOW LIM(S,T)=∞
176
NO
DISABLE EDGES WHERE EDGE ORIGIN IS NOT CREDIT BRIDGE AND EDGE ORIGIN IS NOT EQUAL TO S
177
DISABLE EDGES WHERE EDGE DESTINATION IS NOT CREDIT BRIDGE AND EDGE DEST IS NOT EQUAL TO T
178
COMPUTE MAXIMAL FLOW FROM S TO T
179
STORE MAX FLOW LIM(S,T)=MAX FLOW
180
ENABLE DISABLED EDGES
181
IS T THE LAST NETWORK NODE ?
182
NO
YES
IS S THE LAST NETWORK NODE ?
184
NO
YES
STOP
186
ADVANCE S TO NEXT NETWORK NODE
185
ADVANCE T TO NEXT NETWORK NODE
183

FIG.25


START
191
192
CLEAR EDGE SET G={}
193
LOOK FOR UNPROCESSED ACCOUNT A
194
NO
FOUND ?
YES
195
COMPUTE MIN AND MAX EXCURSION FOR ACCOUNT A
196
ADD EDGE FROM A'S LENDER TO BORROWER WITH MAXIMUM EXCURSION G=GU {{LENDER,BORROWER,MAXEXC(L,Q)}}
197
ADD EDGE FROM A'S BORROWER TO LENDER WITH MINIMUM EXCURSION G=GU {{BORROWER,LENDER,MINEXC(L,Q)}}
STOP
198

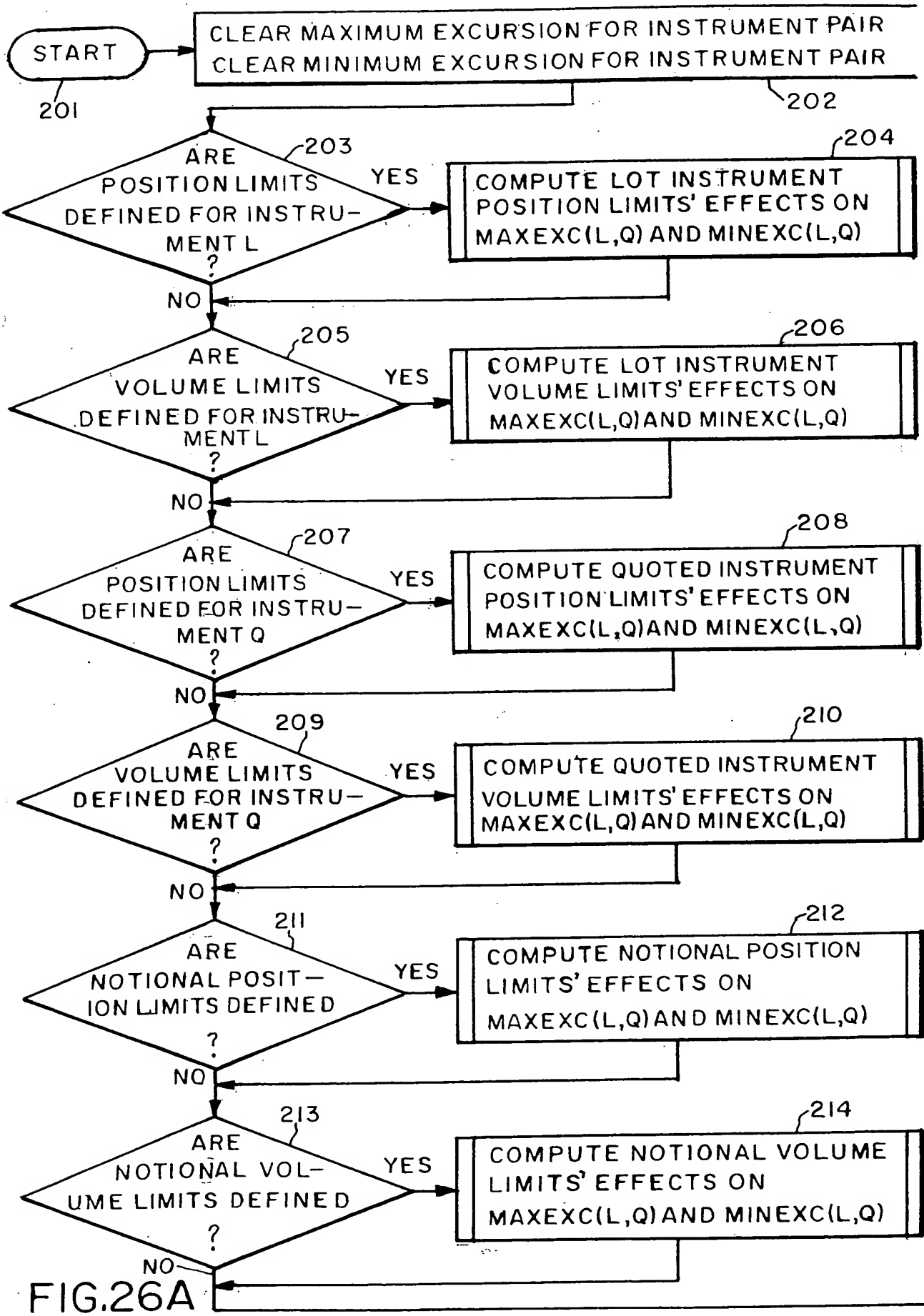

START
201
CLEAR MAXIMUM EXCURSION FOR INSTRUMENT PAIR
CLEAR MINIMUM EXCURSION FOR INSTRUMENT PAIR
202
ARE POSITION LIMITS DEFINED FOR INSTRUMENT L ?
203
YES
COMPUTE LOT INSTRUMENT POSITION LIMITS' EFFECTS ON MAXEXC(L,Q) AND MINEXC(L,Q)
204
NO
ARE VOLUME LIMITS DEFINED FOR INSTRUMENT L ?
205
YES
COMPUTE LOT INSTRUMENT VOLUME LIMITS' EFFECTS ON MAXEXC(L,Q) AND MINEXC(L,Q)
206
NO
ARE POSITION LIMITS DEFINED FOR INSTRUMENT Q ?
207
YES
COMPUTE QUOTED INSTRUMENT POSITION LIMITS' EFFECTS ON MAXEXC(L,Q) AND MINEXC(L,Q)
208
NO
ARE VOLUME LIMITS DEFINED FOR INSTRUMENT Q ?
209
YES
COMPUTE QUOTED INSTRUMENT VOLUME LIMITS' EFFECTS ON MAXEXC(L,Q) AND MINEXC(L,Q)
210
NO
ARE NOTIONAL POSITION LIMITS DEFINED ?
211
YES
COMPUTE NOTIONAL POSITION LIMITS' EFFECTS ON MAXEXC(L,Q) AND MINEXC(L,Q)
212
NO
ARE NOTIONAL VOLUME LIMITS DEFINED ?
213
YES
COMPUTE NOTIONAL VOLUME LIMITS' EFFECTS ON MAXEXC(L,Q) AND MINEXC(L,Q)
214
NO

FIG.26A

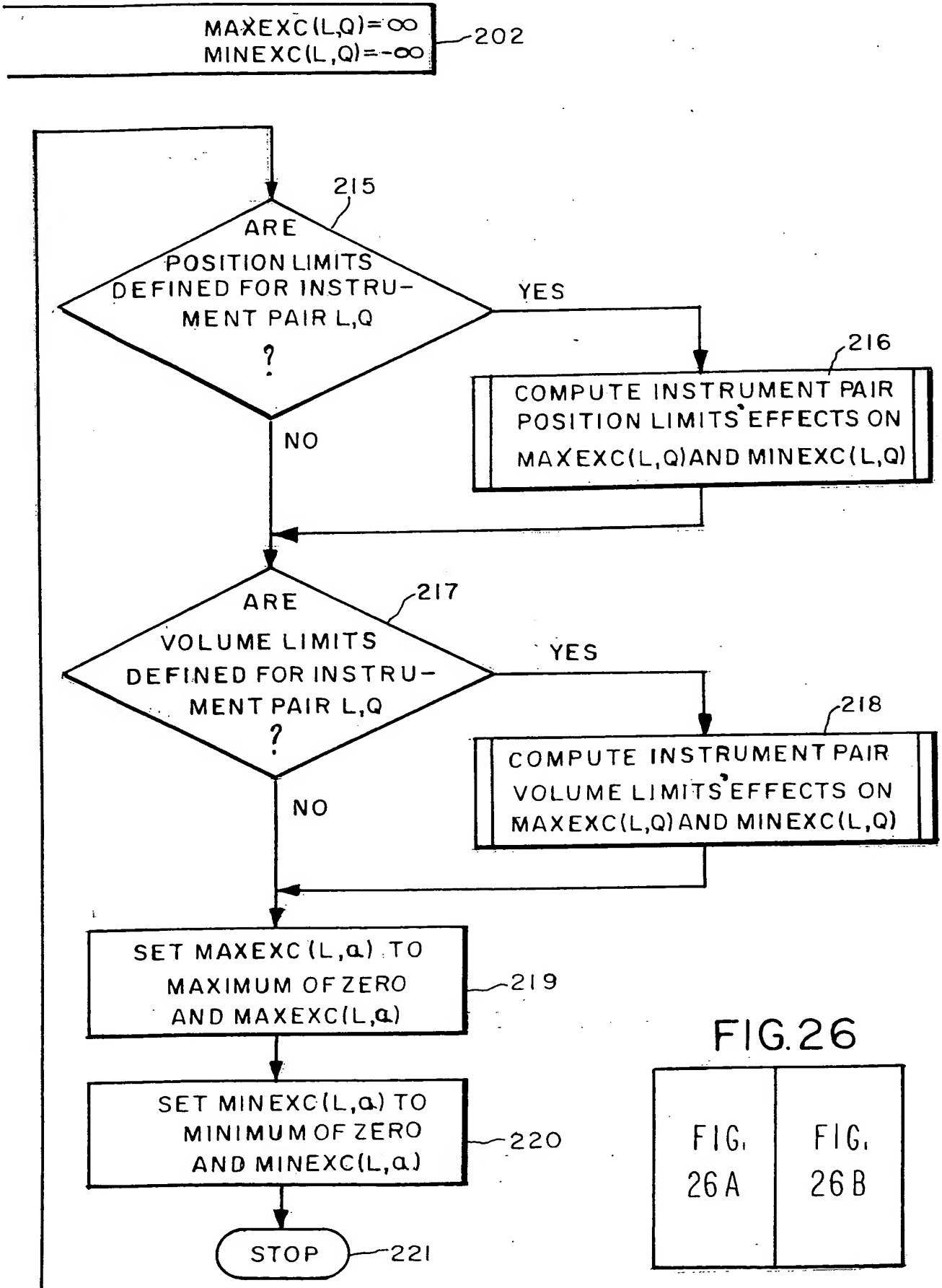


FIG.26B

FIG.26

FIG. 26A	FIG. 26B

FIG.27

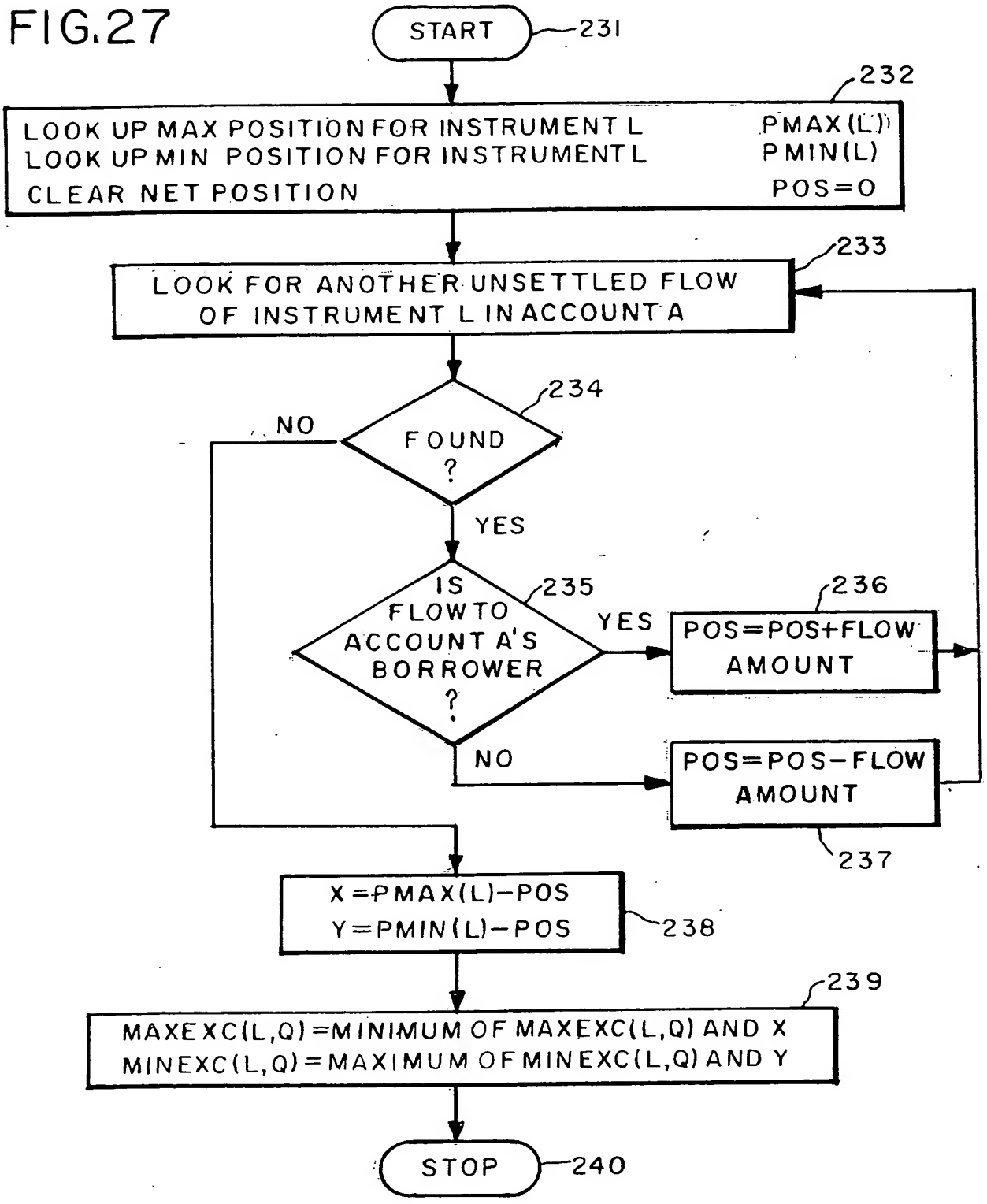

START
231
232
LOOK UP MAX POSITION FOR INSTRUMENT L
LOOK UP MIN POSITION FOR INSTRUMENT L
CLEAR NET POSITION
PMAX(L)
PMIN(L)
POS=0
233
LOOK FOR ANOTHER UNSETTLED FLOW OF INSTRUMENT L IN ACCOUNT A
234
FOUND ?
NO
YES
235
IS FLOW TO ACCOUNT A'S BORROWER ?
YES
236
POS=POS+FLOW AMOUNT
NO
POS=POS-FLOW AMOUNT
237
X=PMAX(L)-POS
Y=PMIN(L)-POS
238
239
MAXEXC(L,Q)=MINIMUM OF MAXEXC(L,Q) AND X
MINEXC(L,Q)=MAXIMUM OF MINEXC(L,Q) AND Y
STOP
240

FIG. 28

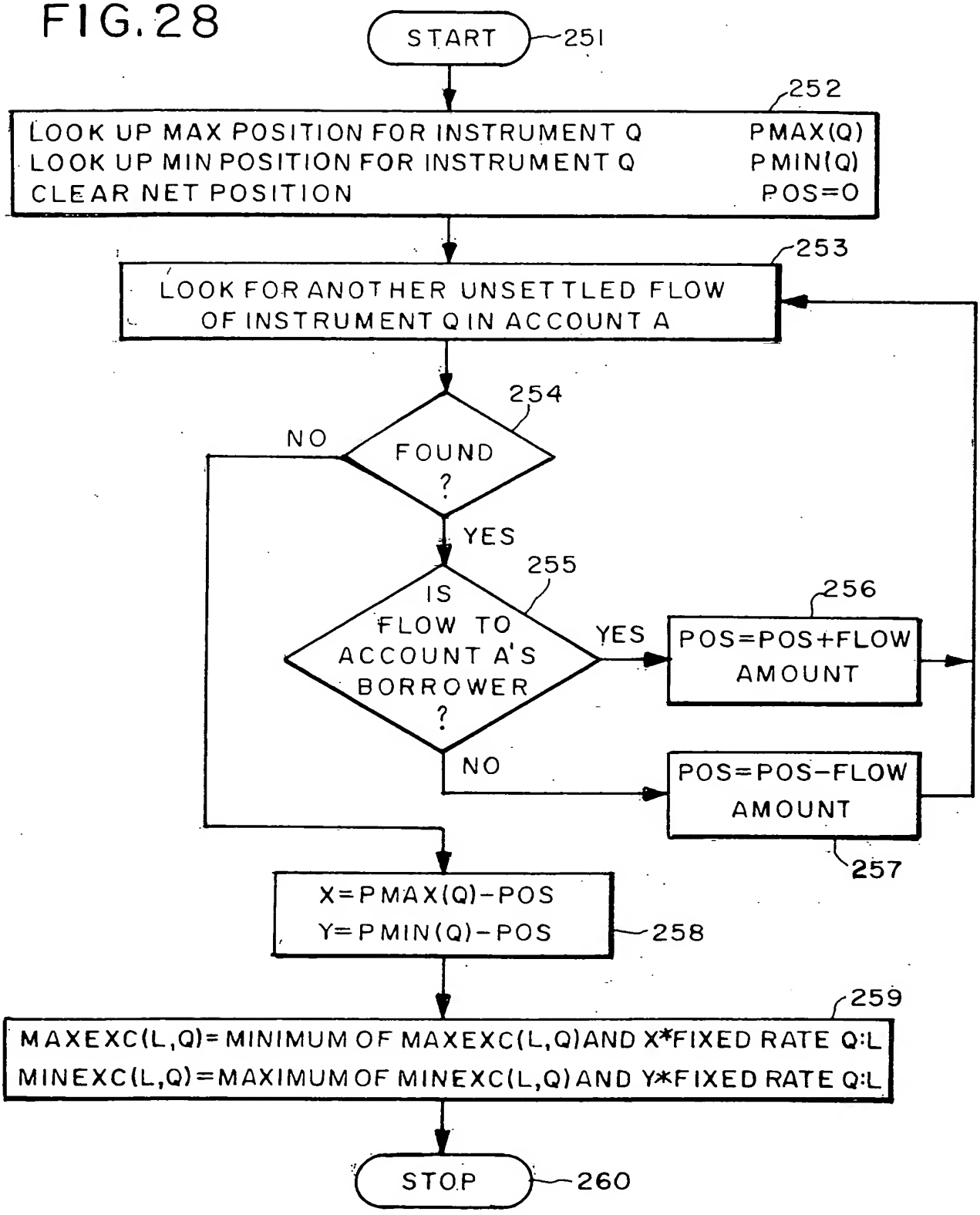

START
251
252
LOOK UP MAX POSITION FOR INSTRUMENT Q
PMAX(Q)
LOOK UP MIN POSITION FOR INSTRUMENT Q
PMIN(Q)
CLEAR NET POSITION
POS=0
253
LOOK FOR ANOTHER UNSETTLED FLOW OF INSTRUMENT Q IN ACCOUNT A
254
FOUND ?
NO
YES
255
IS FLOW TO ACCOUNT A'S BORROWER ?
YES
256
POS=POS+FLOW AMOUNT
NO
POS=POS-FLOW AMOUNT
257
X=PMAX(Q)-POS
Y=PMIN(Q)-POS
258
259
MAXEXC(L,Q)=MINIMUM OF MAXEXC(L,Q) AND X*FIXED RATE Q:L
MINEXC(L,Q)=MAXIMUM OF MINEXC(L,Q) AND Y*FIXED RATE Q:L
STOP
260

FIG.29

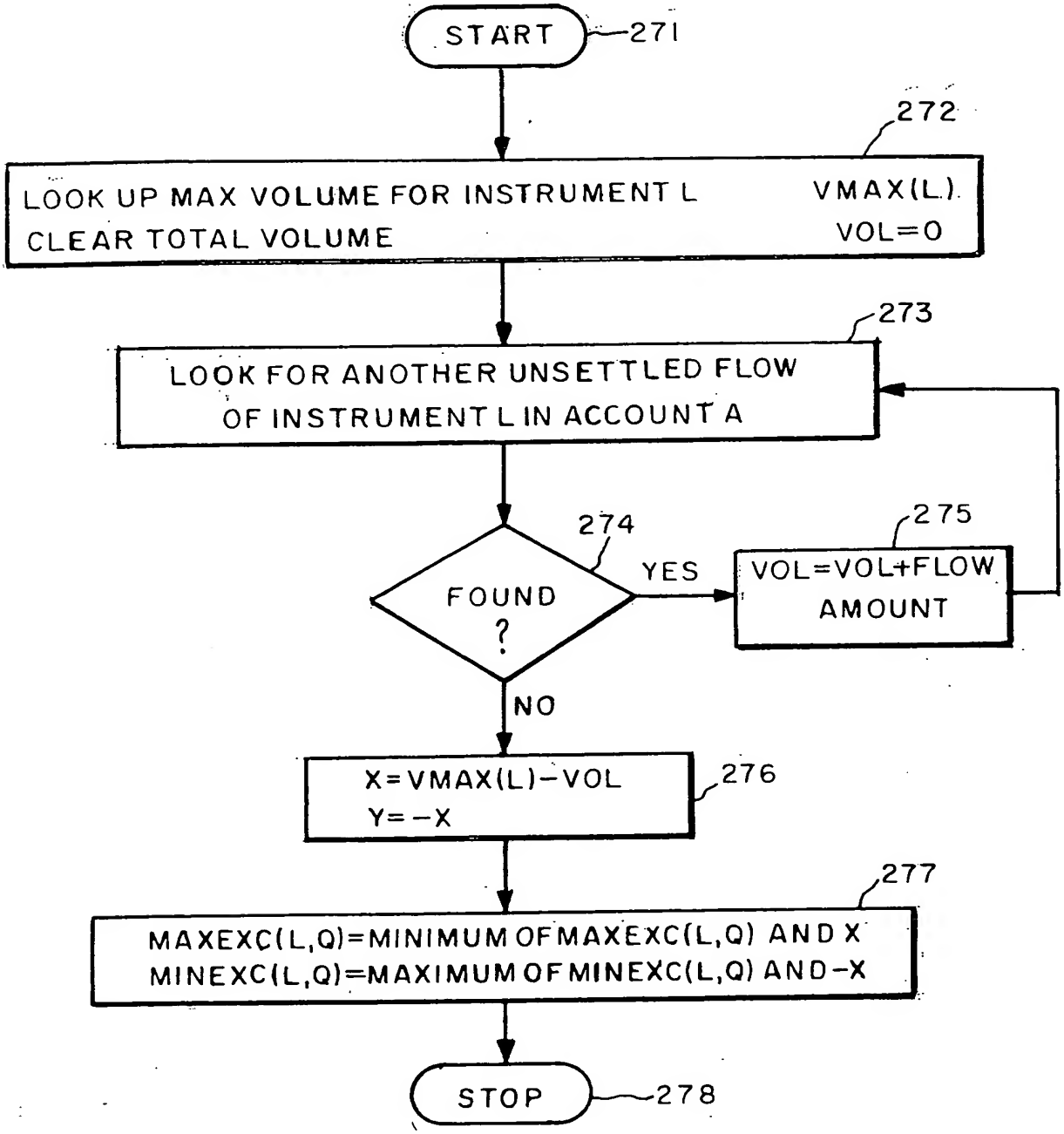

START
271
272
LOOK UP MAX VOLUME FOR INSTRUMENT L
VMAX(L)
CLEAR TOTAL VOLUME
VOL=0
273
LOOK FOR ANOTHER UNSETTLED FLOW
OF INSTRUMENT L IN ACCOUNT A
274
FOUND
?
YES
275
VOL=VOL+FLOW
AMOUNT
NO
X=VMAX(L)-VOL
Y=-X
276
277
MAXEXC(L,Q)=MINIMUM OF MAXEXC(L,Q) AND X
MINEXC(L,Q)=MAXIMUM OF MINEXC(L,Q) AND -X
STOP
278

FIG. 30

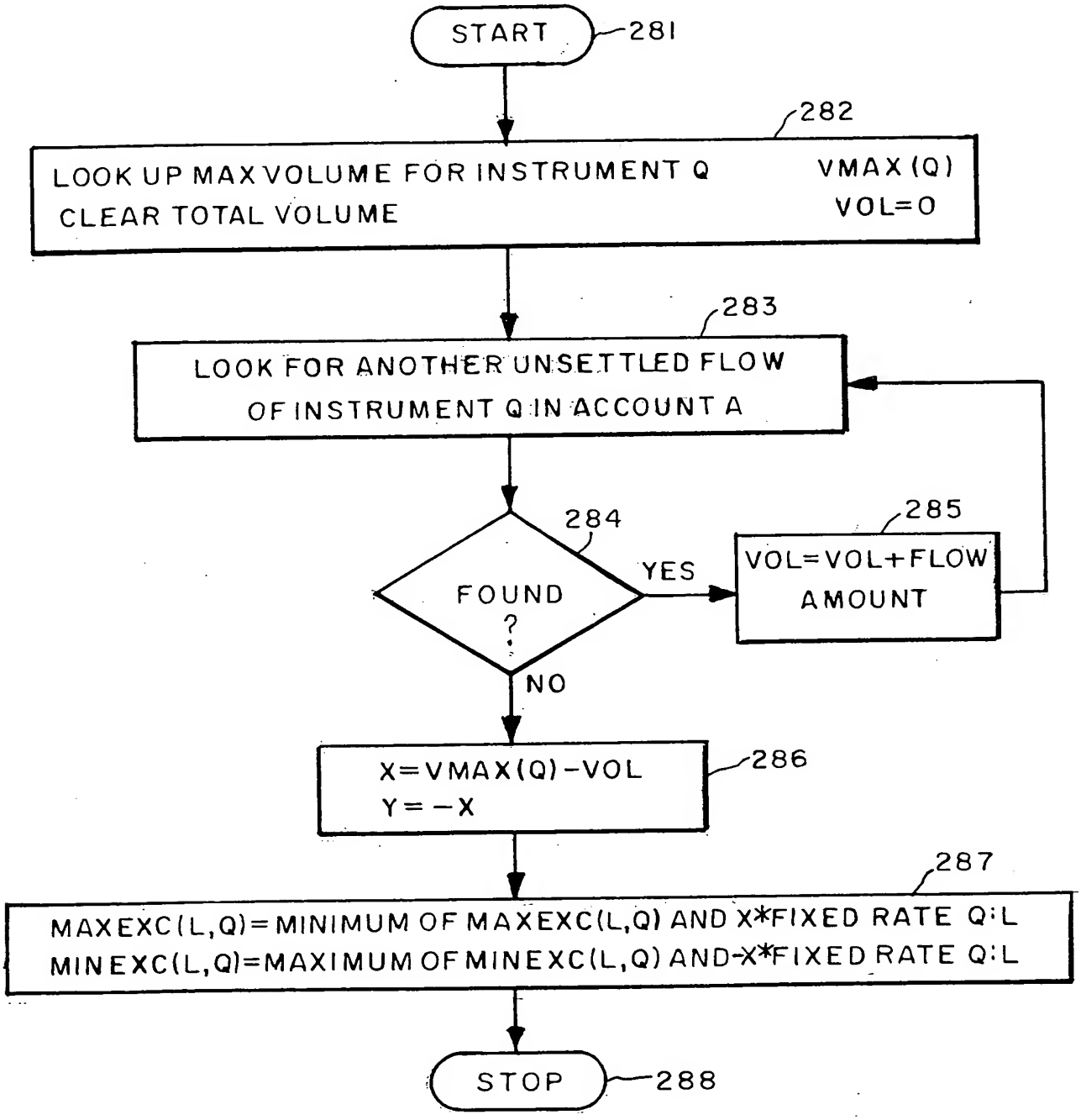

START
281
282
LOOK UP MAX VOLUME FOR INSTRUMENT Q
VMAX(Q)
CLEAR TOTAL VOLUME
VOL=0
283
LOOK FOR ANOTHER UNSETTLED FLOW OF INSTRUMENT Q IN ACCOUNT A
284
FOUND ?
YES
285
VOL=VOL+FLOW AMOUNT
NO
X=VMAX(Q)-VOL
Y=-X
286
287
MAXEXC(L,Q)=MINIMUM OF MAXEXC(L,Q) AND X*FIXED RATE Q:L
MINEXC(L,Q)=MAXIMUM OF MINEXC(L,Q) AND -X*FIXED RATE Q:L
STOP
288

FIG. 31

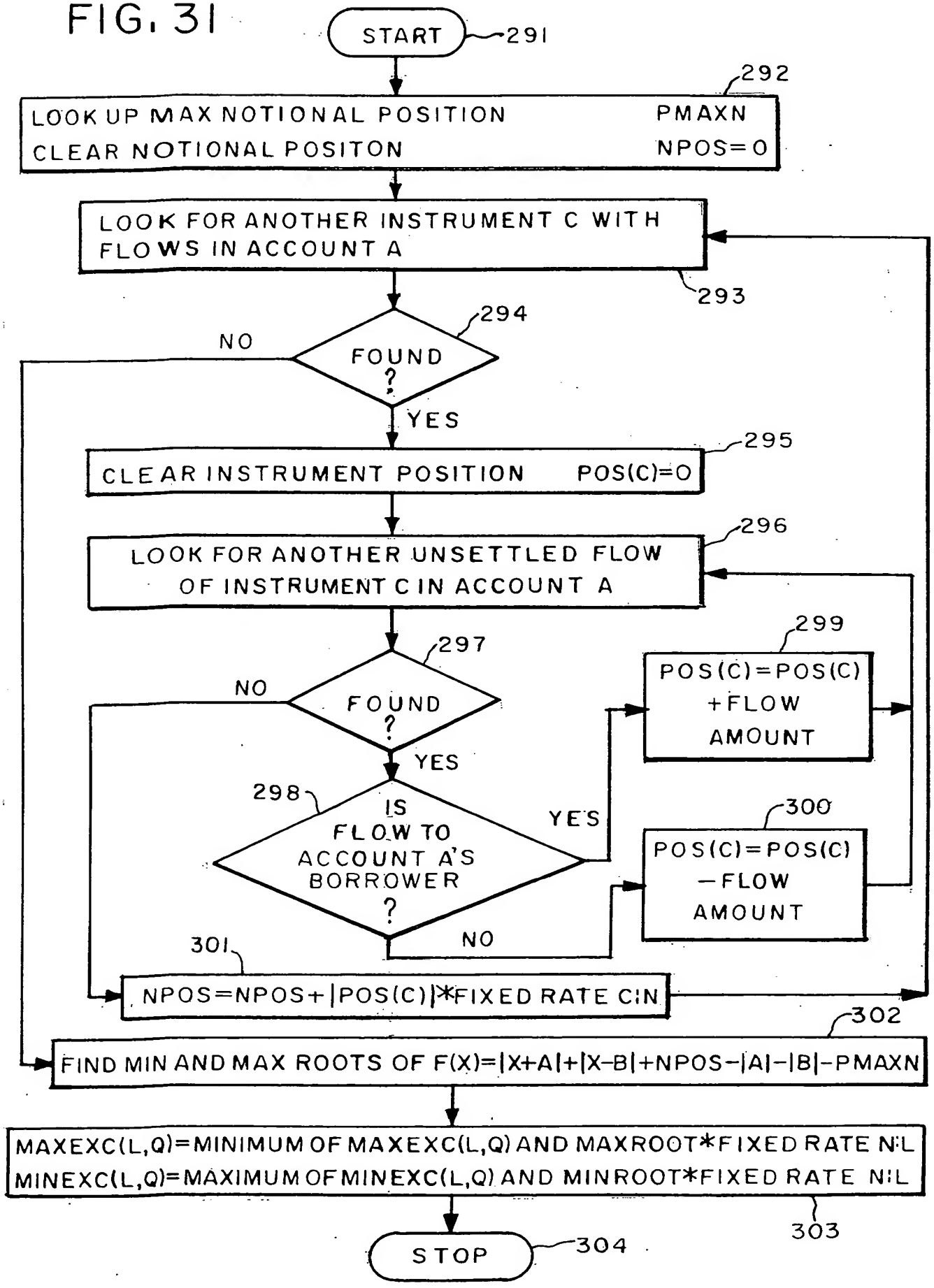

START
291
292
LOOK UP MAX NOTIONAL POSITION PMAXN
CLEAR NOTIONAL POSITON NPOS=0
LOOK FOR ANOTHER INSTRUMENT C WITH FLOWS IN ACCOUNT A
293
294
FOUND ?
NO
YES
295
CLEAR INSTRUMENT POSITION POS(C)=0
296
LOOK FOR ANOTHER UNSETTLED FLOW OF INSTRUMENT C IN ACCOUNT A
297
FOUND ?
NO
YES
299
POS(C)=POS(C) +FLOW AMOUNT
298
IS FLOW TO ACCOUNT A'S BORROWER ?
YES
NO
300
POS(C)=POS(C) -FLOW AMOUNT
301
NPOS=NPOS+|POS(C)|*FIXED RATE C:N
302
FIND MIN AND MAX ROOTS OF F(X)=|X+A|+|X-B|+NPOS-|A|-|B|-PMAXN
MAXEXC(L,Q)=MINIMUM OF MAXEXC(L,Q) AND MAXROOT*FIXED RATE N:L
MINEXC(L,Q)=MAXIMUM OF MINEXC(L,Q) AND MINROOT*FIXED RATE N:L
303
STOP
304

FIG. 32

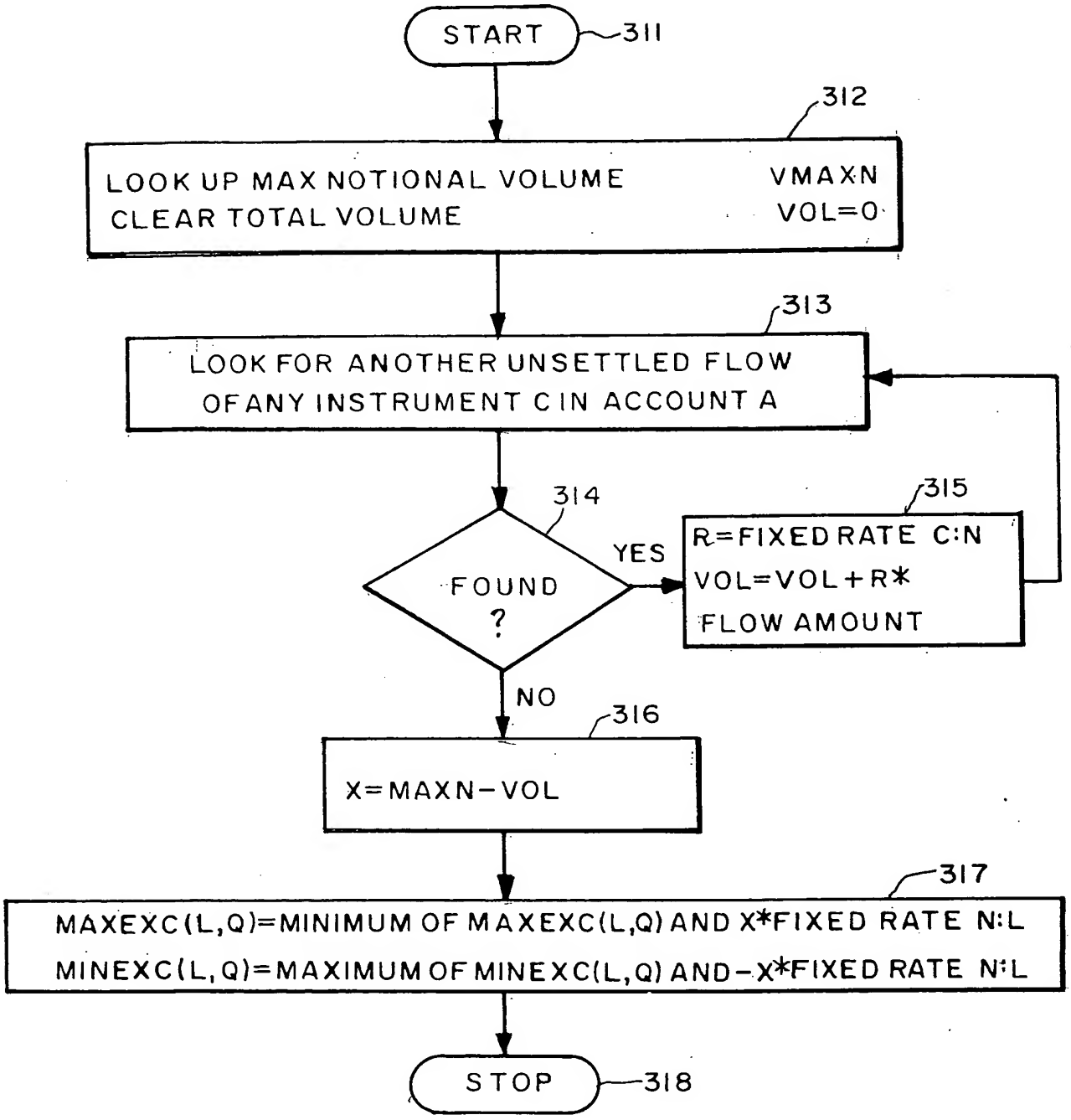

START
311
312
LOOK UP MAX NOTIONAL VOLUME
VMAXN
CLEAR TOTAL VOLUME
VOL=0
313
LOOK FOR ANOTHER UNSETTLED FLOW
OF ANY INSTRUMENT C IN ACCOUNT A
314
FOUND
?
YES
315
R=FIXED RATE C:N
VOL=VOL+R*
FLOW AMOUNT
NO
316
X=MAXN-VOL
317
MAXEXC(L,Q)=MINIMUM OF MAXEXC(L,Q) AND X*FIXED RATE N:L
MINEXC(L,Q)=MAXIMUM OF MINEXC(L,Q) AND -X*FIXED RATE N:L
STOP
318

FIG. 33

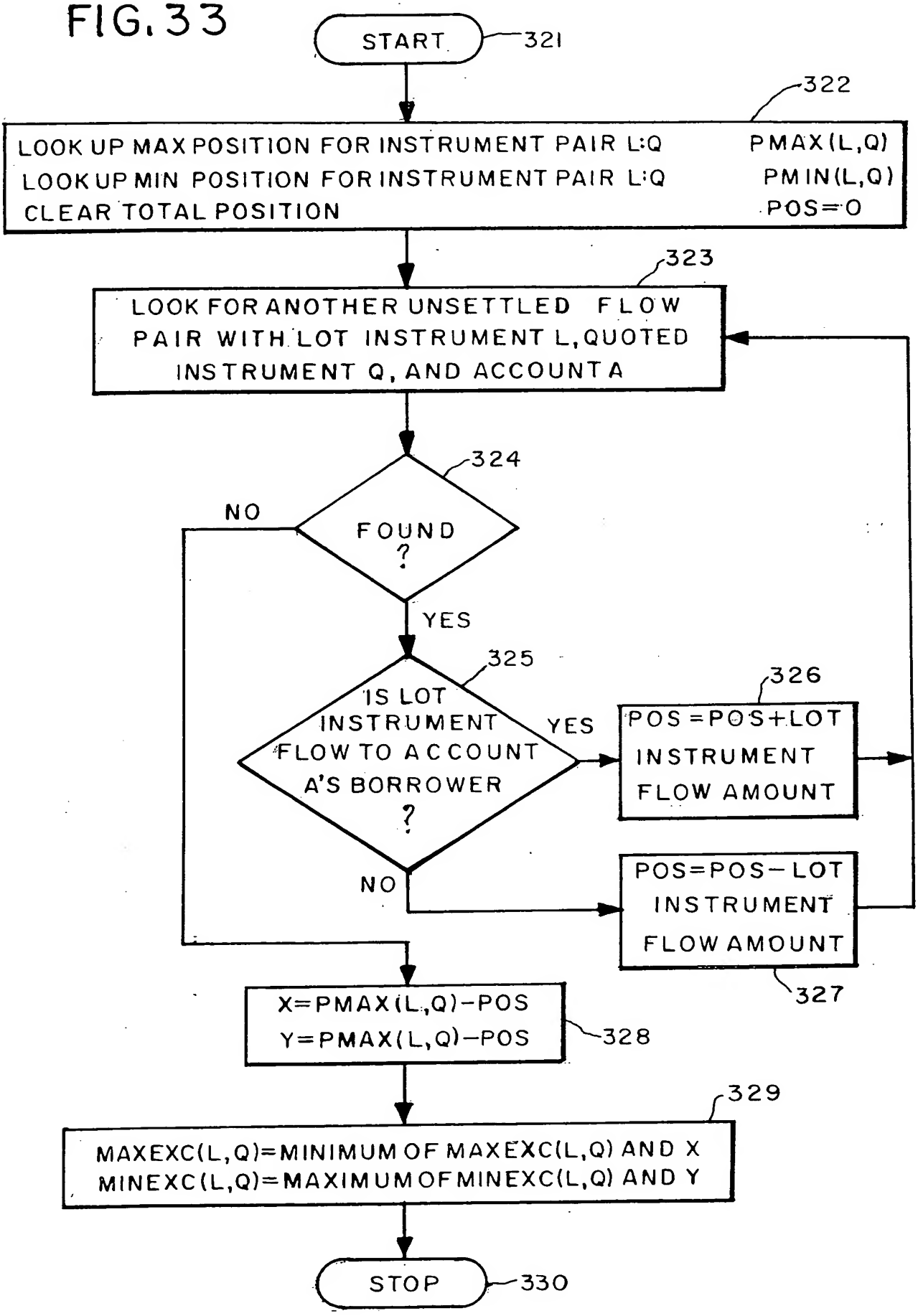

START
321
322
LOOK UP MAX POSITION FOR INSTRUMENT PAIR L:Q
PMAX(L,Q)
LOOK UP MIN POSITION FOR INSTRUMENT PAIR L:Q
PMIN(L,Q)
CLEAR TOTAL POSITION
POS=0
323
LOOK FOR ANOTHER UNSETTLED FLOW PAIR WITH LOT INSTRUMENT L, QUOTED INSTRUMENT Q, AND ACCOUNT A
324
FOUND ?
NO
YES
325
IS LOT INSTRUMENT FLOW TO ACCOUNT A'S BORROWER ?
YES
326
POS=POS+LOT INSTRUMENT FLOW AMOUNT
NO
POS=POS-LOT INSTRUMENT FLOW AMOUNT
327
X=PMAX(L,Q)-POS
Y=PMAX(L,Q)-POS
328
329
MAXEXC(L,Q)=MINIMUM OF MAXEXC(L,Q) AND X
MINEXC(L,Q)=MAXIMUM OF MINEXC(L,Q) AND Y
STOP
330

FIG. 34

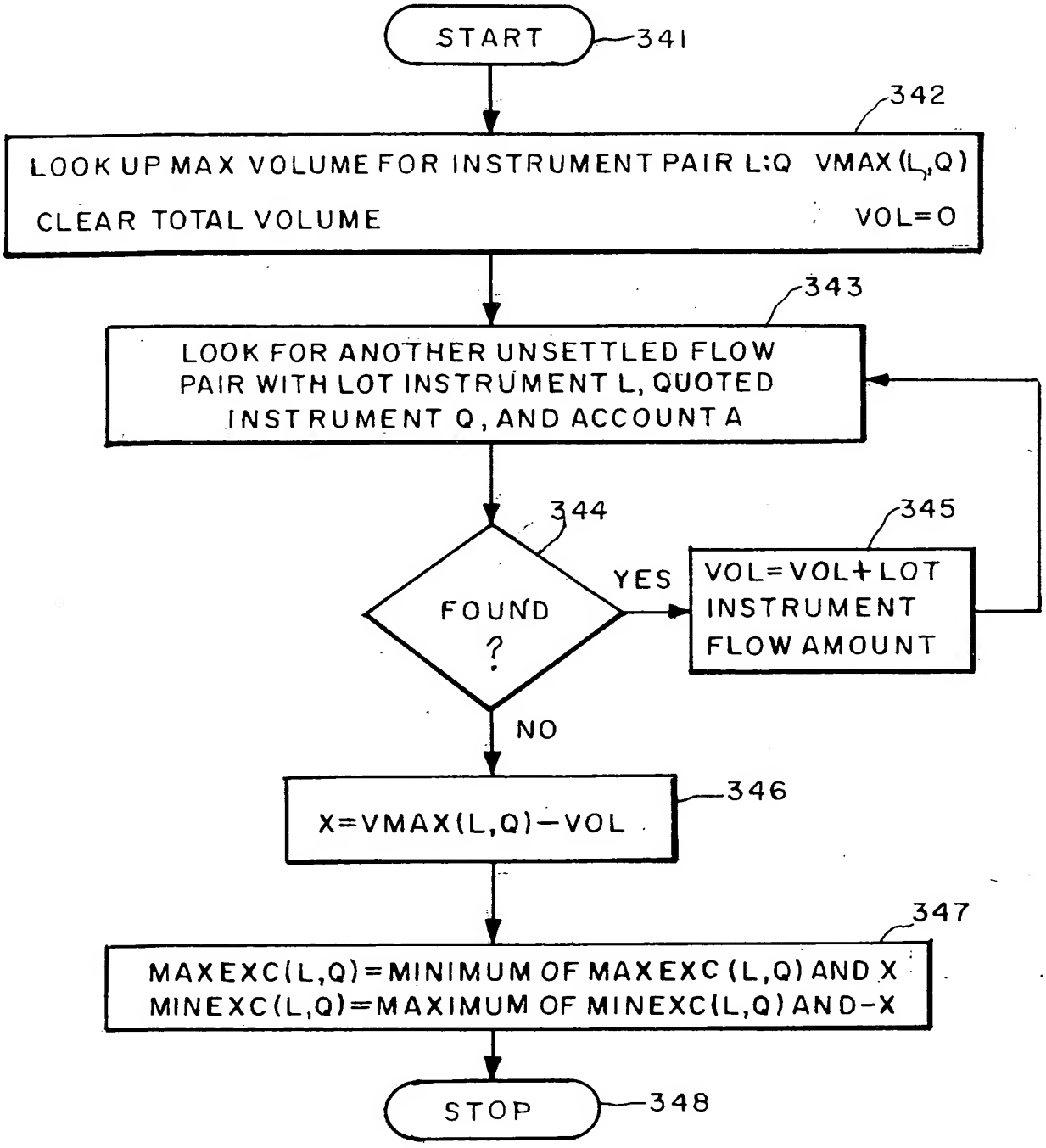

START
341
342
LOOK UP MAX VOLUME FOR INSTRUMENT PAIR L:Q VMAX(L,Q)
CLEAR TOTAL VOLUME VOL=0
343
LOOK FOR ANOTHER UNSETTLED FLOW PAIR WITH LOT INSTRUMENT L, QUOTED INSTRUMENT Q, AND ACCOUNT A
344
FOUND ?
YES
345
VOL=VOL+LOT INSTRUMENT FLOW AMOUNT
NO
346
X=VMAX(L,Q)−VOL
347
MAXEXC(L,Q)=MINIMUM OF MAXEXC(L,Q) AND X
MINEXC(L,Q)=MAXIMUM OF MINEXC(L,Q) AND −X
STOP
348

FIG. 35

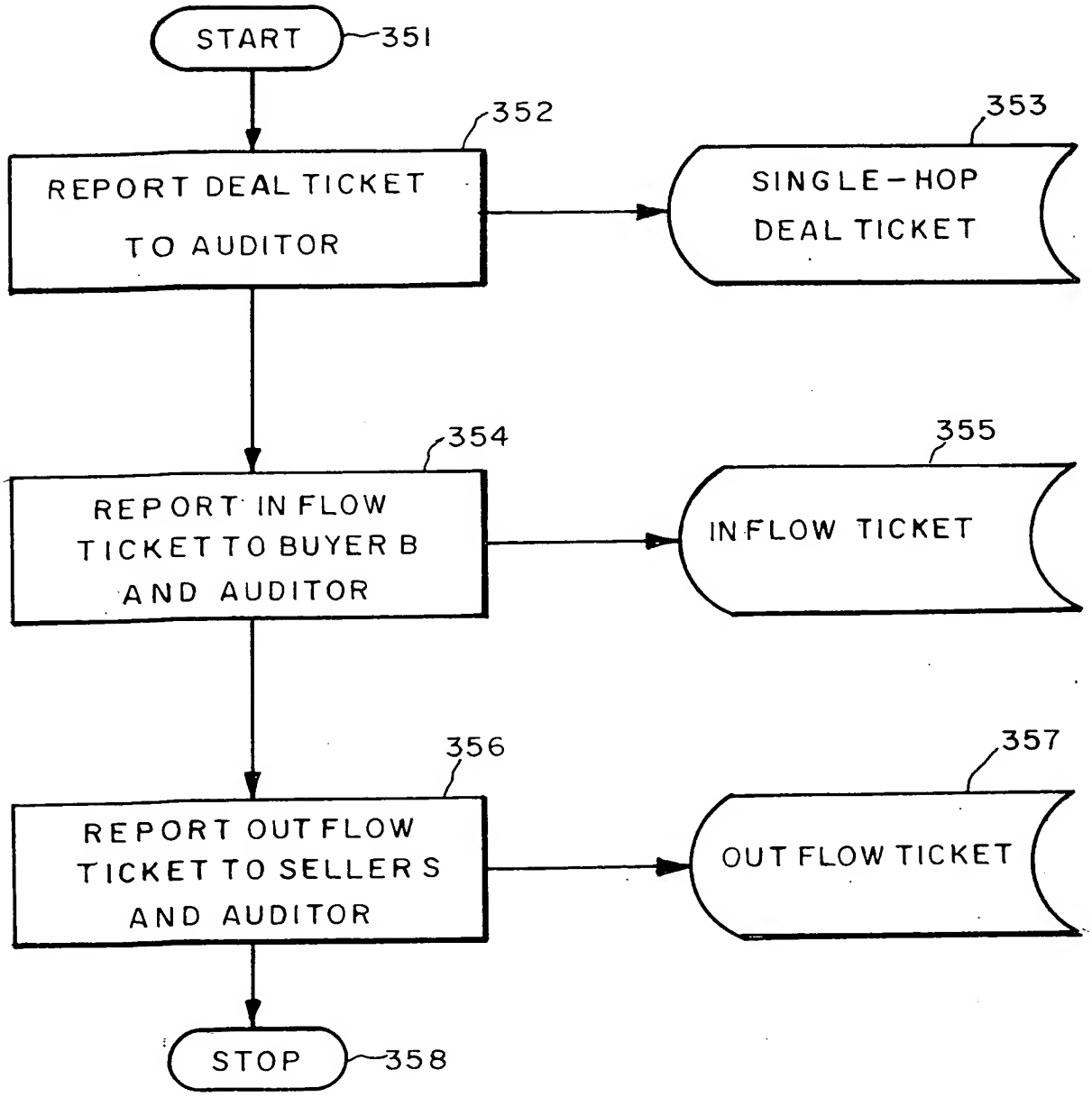
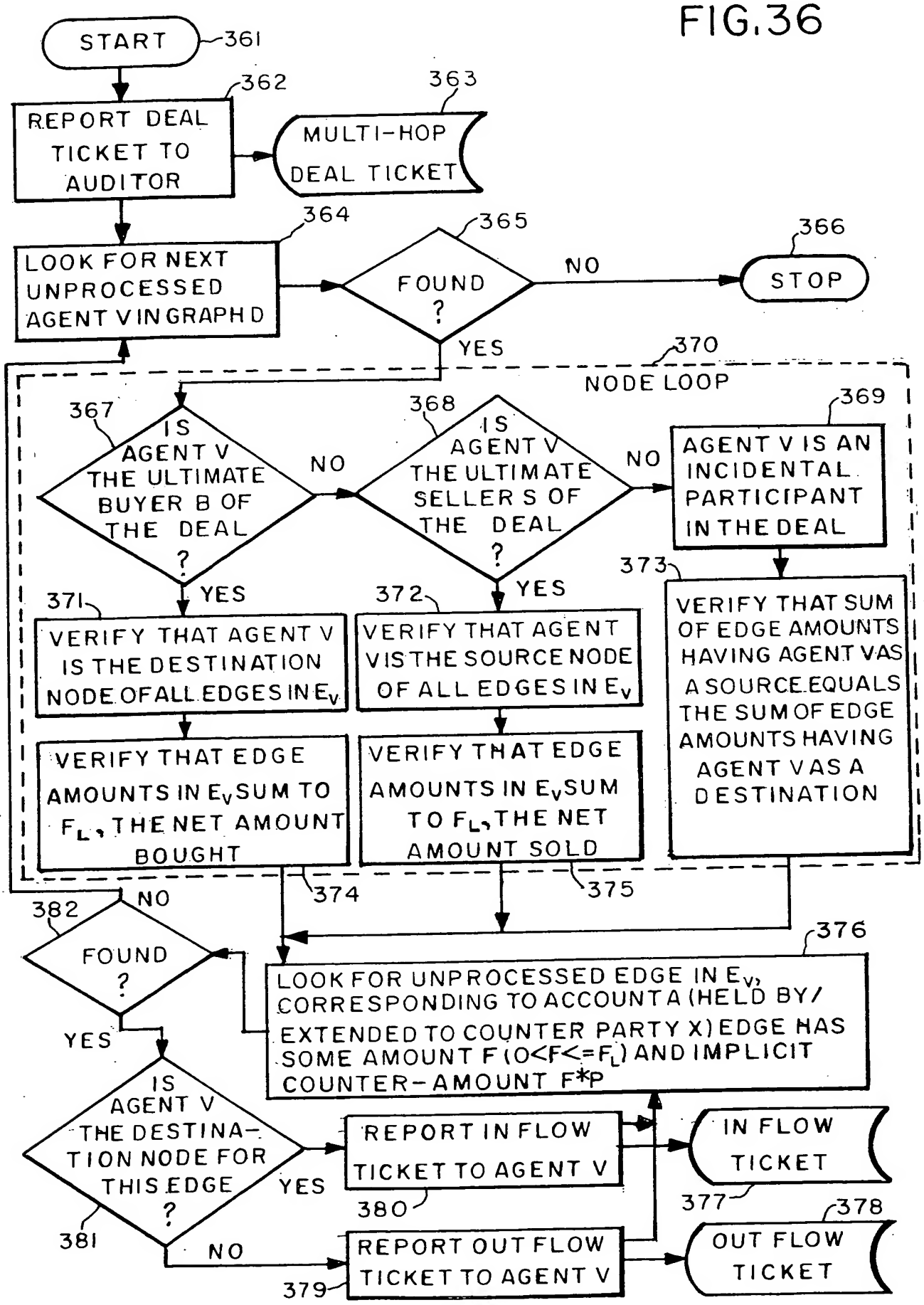

START
351
352
REPORT DEAL TICKET TO AUDITOR
353
SINGLE-HOP DEAL TICKET
354
REPORT IN FLOW TICKET TO BUYER B AND AUDITOR
355
IN FLOW TICKET
356
REPORT OUT FLOW TICKET TO SELLER S AND AUDITOR
357
OUT FLOW TICKET
STOP
358

FIG.36


START
361
REPORT DEAL TICKET TO AUDITOR
362
MULTI-HOP DEAL TICKET
363
LOOK FOR NEXT UNPROCESSED AGENT V IN GRAPH D
364
FOUND ?
365
NO
STOP
366
YES
NODE LOOP
370
IS AGENT V THE ULTIMATE BUYER B OF THE DEAL ?
367
NO
IS AGENT V THE ULTIMATE SELLER S OF THE DEAL ?
368
NO
AGENT V IS AN INCIDENTAL PARTICIPANT IN THE DEAL
369
YES
VERIFY THAT AGENT V IS THE DESTINATION NODE OF ALL EDGES IN E_V
371
YES
VERIFY THAT AGENT V IS THE SOURCE NODE OF ALL EDGES IN E_V
372
VERIFY THAT SUM OF EDGE AMOUNTS HAVING AGENT V AS A SOURCE EQUALS THE SUM OF EDGE AMOUNTS HAVING AGENT V AS A DESTINATION
373
VERIFY THAT EDGE AMOUNTS IN E_V SUM TO F_L, THE NET AMOUNT BOUGHT
374
VERIFY THAT EDGE AMOUNTS IN E_V SUM TO F_L, THE NET AMOUNT SOLD
375
NO
FOUND ?
382
YES
LOOK FOR UNPROCESSED EDGE IN E_V, CORRESPONDING TO ACCOUNT A (HELD BY/ EXTENDED TO COUNTER PARTY X) EDGE HAS SOME AMOUNT F ($0<F<=F_L$) AND IMPLICIT COUNTER-AMOUNT F*P
376
IS AGENT V THE DESTINATION NODE FOR THIS EDGE ?
381
YES
REPORT IN FLOW TICKET TO AGENT V
380
IN FLOW TICKET
377
NO
REPORT OUT FLOW TICKET TO AGENT V
379
OUT FLOW TICKET
378